DOCUMENT RESUME

ED 239 263	CS 208 075
TITLE	Proceedings: International Technical Communication Conference (30th, St. Louis, Missouri, May 1-4, 1983).
INSTITUTION	Society for Technical Communication, Washington, D.C.
REPORT NO	ISBN-0-914548-39-5
PUB DATE	83
NOTE	485p.; For related documents, see CS 208 076-101.
AVAILABLE FROM	Society for Technical Communication, 815 15th St., N.W., Suite 506, Washington, DC 20005 ($25.00 member, $45.00 non-member); Univelt, Inc., P.O. Box 28130, San Diego, CA 92128 (write for price).
PUB TYPE	Collected Works - Conference Proceedings (021) -- Reports - Descriptive (141) -- Viewpoints (120)
EDRS PRICE	MF02/PC20 Plus Postage.
DESCRIPTORS	Business; *Computers; Editing; *Education Work Relationship; Graphic Arts; Higher Education; Information Dissemination; Inplant Programs; Inservice Education; *Layout (Publications); Newsletters; *Organizational Communication; *Production Techniques; Program Content; Program Development; Programing; Publications; *Technical Writing; Training Methods; Word Processing; Writing Instruction; Writing Skills
IDENTIFIERS	*Technical Communication

ABSTRACT

Prepared by representatives of government, business, industry, and education, the papers in this compilation deal with a variety of aspects of technical communication. The approximately 150 papers are arranged according to the following categories: advanced technology applications, graphics and production, management and professional development, research education and training, and writing and editing. Specific topics covered in the papers include the following: (1) taking the mystery out of computers; (2) how to write a great user's manual; (3) computerized reading analysis; (4) automating the writing process; (5) tailor made retrieval systems; (6) the importance of the designer in the process of developing technical documentation; (7) the information film; (8) photography and the publication process; (9) recruiting and hiring technical writers and editors; (10) design, development, and implementation of a total quality control system; (11) stress management for technical communication; (12) the relationship between academia and industry; (13) developing academic technical communication programs; (14) teaching technical students to communicate; (15) developing student job hunting skills; (16) technical writing as a career; and (17) interpersonal relationships for writers and editors. (FL)

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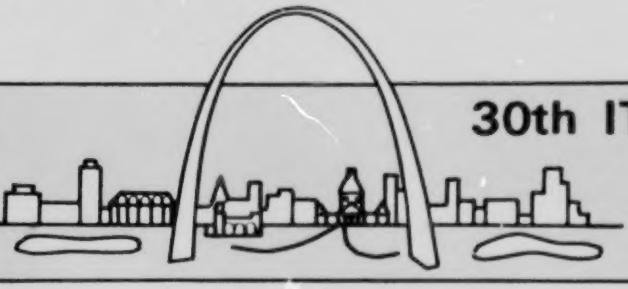

30th ITCC ST. LOUIS
1983

EDITION 30
SPIRIT OF TECHNICAL COMMUNICATION

ED239263 - ED239289

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Proceedings

30th International Technical Communication Conference

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ISBN 0-914548-39-5
STC 111-83

Printed in the United States of America

Cover by Norbert Michel

FOREWORD

The accumulated wisdom of our profession is gathered annually and placed within these covers. It then serves as a primary reference and how-to book for those who attend the ITCC for years to come. I still have the proceedings from my first ITCC in St. Louis, 1974, and I have most of those which followed through the years.

Because of the continuing value of the proceedings, this year's Program Committee was determined to maintain the same high level that characterized earlier proceedings. We feel that we have accomplished that goal. I attribute our success to the excellent staff of this year's committee: Stem Managers Robert Di Giovanni, Penelope Grenoble, Lionel Howard, Helen Lindberg, and John Stribravy.

The ultimate credit for the program, however, rests with the members and guest speakers who contributed the material which went into the program. Technical writers play with incidental statistics as a normal part of their daily routine, so it was not surprising that I applied some loosely derived statistics to this year's program: if the 158 speakers, 59 moderators, and 37 workshop leaders contributed an average of 40 hours each (a conservative estimate) to developing their presentation, and if the fair market value of their time averaged $20 per hour, the value of the preparation was better than $200,000. In many cases, employers allowed official time for such work besides paying registration and travel to the conference, a clear indication of the value they place on professional activities. Others contribute their personal time and absorb the expense as proof of their dedication to the Society and the profession. To purchase the results of that investment for the nominal price charged for this publication has to be one of the bargins of all time.

Two other colleagues have to receive special mention for their part in the program. My deputy, Renee Barnow, has served as critic, gadfly, helper and friend, with a strong role in making it all possible. Chuck DePaepe, Planning Committee Manager, has been an ally and confidant of great value. To you two and to the Stem Managers, my heartfelt thanks.

So now our work nears completion. The product is in the hands of the ultimate consumer, and yours is the verdict that counts. We have enjoyed preparing it for you. May it bring you comfort and assistance as you return to face the daily problems which await the interpreters of technology.

Duke Stoner
30th ITCC Program Manager

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GENERAL MANAGER'S MESSAGE

Putting together an International Technical Communications Conference begins with the winning proposal, which is submitted about five years before the conference. Two committees are responsible for management of the conference: the Planning Committee and the Program Committee. Ten committees make up the Planning Committee, and five stem managers and their deputies make up the Program Committee.

Our goal this year, as is the case each year, is to provide the finest conference ever—one having the best in facilities and arrangements and one having the best in program presentations, workshops, and special forums.

Each of us responsible for the total effort of gluing it all together are especially proud of serving the Society membership. The long hours and many frustrations somehow become insignificant when we measure them against the professional experience that the conference brings to us. The ITCC is much more than presenting papers, conducting workshops, exhibiting winning art and publication entries, and displaying industrial exhibits. It's the interaction of people who come to the conference to teach, to learn, to give and take in the best professional setting we can produce. The net worth to each of us is the unique individual enrichment we get by participating in the rewarding atmosphere that each ITCC brings.

Those of us on the Planning Committee extend a warm thanks to the speakers, moderators, and workshop leaders. For without you and your contributions, there would be no conference. Our association with each other has brought about many friendships. May they continue to endure.

Charles E. DePaepe
General Manager
30th International Technical
Communication Conference

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INTRODUCTION AND ACKNOWLEDGEMENTS

We compiled the Proceedings from camera-ready pages furnished by stem managers, panel moderators, and speakers prior to the conference. We appreciate their efforts in providing papers of professional quality.

We would also like to thank the following members of the St. Louis chapter of the STC whose efforts made our task more tolerable and enjoyable:

Joe Clayton
Christine Hannibal
Mary Lauburg
Dan Murphy
Carol Niederlander
Floyd Walters

Our special thanks to Laura Hamilton, vice-president of the St. Louis chapter, and Chuck DePaepe, general manager of the 30th ITCC, whose work, suggestions, and companionship made this publication a reality.

Finally we gratefully thank Norbert Michel for his imaginative artwork.

Ken Boyer   Jan Rahm
Printing Committee

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ADVANCED TECHNOLOGY APPLICATIONS STEM

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Lionel Howard, Head of the Technical Publication Department at Bell Laboratories, is a Senior member of the STC. He has been involved with technical communication for over twenty years. Lionel started his career at Bell Labs as a development engineer before becoming Associate Editor of the *Bell System Technical Journal* and then Editor. Prior to his assignment as Department Head, he was Managing Editor of the *Record*, Bell Laboratories' monthly magazine.

As Head of the Technical Publication department, Lionel manages an organization responsible for documenting the work of Bell Laboratories. He is also responsible for developing a computerized Publication Management System.

Lionel has developed in-house training programs for new technical communicators and is responsible for conducting research into new documentation techniques. Lionel proposed, designed, and instituted a graduate extension at Bell Labs in Technical Communications through Rensselaer Polytechnic Institute.

Lionel received his B.S. from Rutgers University and recently completed an Executive Management Program at Penn State University. Lionel has been active in the STC for several years having served the New York Chapter as 1st Vice Chairman and 2nd Vice Chairman. He has spoken at several chapter meetings on the changing requirements of Technical Communicators, and has presented papers at several International Technical Communications Conferences.

Unquestionably, computers are becoming an intrinsic part of the Technical Communicator's job. More and more writers, editors and managers are hard-wired, logged-on and on-line. But these miracles of modern technology are not without their attendant problems. How, then, do we meet the extra challenges in our workday associated with the computer and other miracles of modern technology?

Speakers in this year's Advanced Technology Applications stem offer suggestions and recommendations resulting from their own experiences with new technologies. You will hear innovative leaders from government, industry, and academia present sessions on such subjects as:

- On-line Documentation
- Planning Your Text Processing
- Multilingual Computer Translation
- Using Computers in Planning to Publishing
- Hi-Tech Applications to Documentation
    - — Laser printers
    - — Sophisticated technical word-processing equipment
- What to Look For in Word-Processing Systems
- Electronic Documentation's New Role

You can take part in the many ATA workshops, most of which offer hands-on computer demonstrations, given on the following topics:

- Readability Programs for the Apple Computer
- A User-Oriented Information Retrieval System
- Using Electronic Media for Education
- A Word-Processing System That Enjoys Math
- How to Write a Great User's Manual

Because of the overwhelming response to an impromptu meeting for computer users at last year's conference, the ATA stem is hosting the *First Annual Meeting of Information-Handling-Equipment Users*. This undoubtedly will become a standard offering for the stem — a friendly forum for exchanging questions and ideas about computer-related technology.

Right now our profession is in an exciting transition from the mechanical to the electronic age. I hope that what you see and hear at the ATA stem will help to make your transition a little smoother.

STATE-OF-THE-ART INFORMATION-HANDLING SYSTEMS FROM THE TECHNICAL COMMUNICATOR'S POINT OF VIEW

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Chapman and Cutler

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Current STC Secretary,
Manager, STC Subcommittee on
Computer and Technology Applications

At last year's ITCC I gave a presentation titled "What to Look for in State-of-the-Art Word Processing Equipment" that discussed what those seeking to acquire state-of-the-art word processing systems should look for in both that equipment and the organization that sells and supports it. Since last year, the capabilities of word processing systems have continued to change rapidly. Indeed, the word processing industry has been talking and writing more about office automation/information-handling systems that include software and hardware for both decision and administrative support as well as for word processing than it has about word processing systems as a separate entity. In the presentation that I will give at this year's ITCC, I will cover the capabilities these information-handling systems have acquired since my May 1982 presentation from the point of view of the technical communicator; that is, while I will make brief mention of some new system capabilities that would be of only passing interest to the average technical communicator, I will concentrate on those new capabilities of information-handling/word processing systems that would be of interest to technical communicators who are either using such equipment to write or edit technical material themselves or who are in charge of acquiring and making effective use of such equipment within technically oriented organizations.

Copies of the complete "script" of the presentation will be available for those who attend the session.

HOW A COMPUTER IS DEVELOPED AND PRODUCED

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The computer has been voted man of the year. Although this statement should not be taken too seriously, it does demonstrate that somehow everybody is influenced by the benedictions and maledictions of computing nowadays.

The purpose of this paper is to take the mystery out of computers and to explain the methods used in their development and production. The reader learns about the whole palette of development and production processes from technological development to quality assurance, with emphasis on simulation and uniform product documentation. The paper is rounded off by some general remarks on the economic importance of computing and the consequences of a computerized society.

The Economic Importance of Computing

The worldwide revenue from DP products was about 70 billion US dollars in 1981; by the beginning of 1982, the total installed base of DP systems exceeded 200 billion dollars in value. At the present time, about five million people, including the users, are employed in data processing. These figures emphasize the economic importance of computing.

As technolocical pacemaker for solving economic and social problems, the computer can change the face of many jobs. It is predominantly in occupations involving a high degree of routine work that its application will lead to a fall in staff levels. However it is by no means certain which will gain the upper hand when new techniques are introduced, the much feared redundancies or the creation of new jobs. In any event, the economy is forced to rationalize further in order to stay competetive, and to open new markets by means of new products.

Computing, office equipment, and communications have been growing together since the beginning of the seventies, into a single information technology; this trend will continue more strongly in the coming years. The raw material we call information will become available to everyone, everywhere, and at an acceptable price, as a result of private computer networks, and to an increasing extent public services networks.

Technology

For years, the technologies used in computing have set the pace for increasing performance and falling costs of DP systems. The performance of integrated logic and memory circuits has scored highest here; the development was set in motion by the invention of the transistor in 1948 and has since been marked by the following milestones:

- 1960: first integrated logic circuit
- 1969: first integrated memory circuit (256 bit)
- 1974: first microprocessor.

The as yet unbroken trend towards higher degrees of integration and ever shorter switching times is demonstrated especially clearly by the developments in storage capacity of integrated memory chips and the switching times for integrated logic elements (fig. 1).

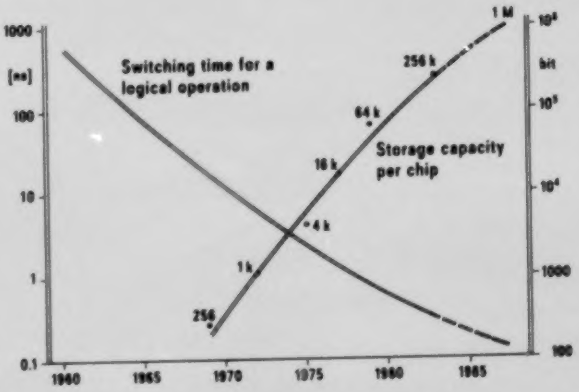

Figure 1: Characteristic Parameters of Logic and Memory Circuits

While the switching time for a logical operation has been reduced by a factor of 2 roughly every two years for the past twenty years (by a factor of a thousand overall), in the case of capacity of integrated memories a 10 000-fold improvement has been attained.

Not only the performance of a computer is determined by the technologies employed. The production costs, and therefore the competitiveness and cost effectiveness, depend heavily on the use of state-of-the-art components.

Architecture

The structure of the DP system (fig. 2) to be developed essentially influences the logical design and its physical realization (s. sections 5 and 6).

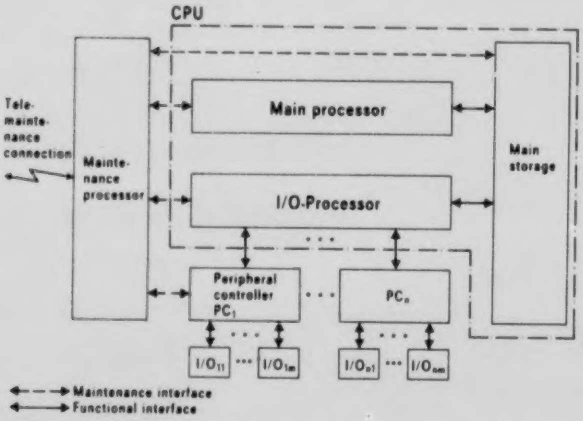

Figure 2: Structure of a Data Processing System

The heart of the computer is the main processor, which operates on the programs and data contained in the main storage. Its performance has been significantly increased in the last few years by improvements in circuit technology (integration, greater reliability, lower power dissipation) and in architecture (memory hierarchy and error recognition/correction).

The input/output (I/O) processor, together with the peripheral control units, ensures that data are fed to the main storage from the input devices at the right rate. It also has to get the processed data to the appropriate output devices as quickly as possible, so that expensive storage locations are not occupied unnecessarily.

Remote or local data terminals can also be attached to the system via special peripheral controllers, and thus process the data in an interactive dialog between user and machine.

Modern DP systems (main frames) contain a maintenance processor in addition, connected to the most important components via special interfaces. It is specially suited to hardware testing of such components, and can even be set in operation from a distant service center, using the teleservice (remote maintenance) facility.

The test program system forms the basis of a maintenance processor, and serves first and foremost to recognize and localize errors, but is also employed for functional tests and preventive diagnosis. It can provide certain services like initial program loading, error correction, and teleservice.

Computer Aided Design (CAD)

FUNCTIONAL PROGRAMS

The wide range of functions processed by powerful modern CPUs requires an architecture using hundreds of thousands of logic elements (gates). Converting the logical design of a CPU into a technical implementation would therefore be unthinkable without a design automation system complete with storage of all the design data and a convenient modification facility (fig. 3). With such a system, programs simulate the design steps of positioning, wire routing, propagation time calculation and realtime behavior in an iterative process until an optimum balance is found between the prescribed specifications. The aim of this simulation is to check and describe not just the logical structure, but also the planned physical implementation, before production and testing take place.

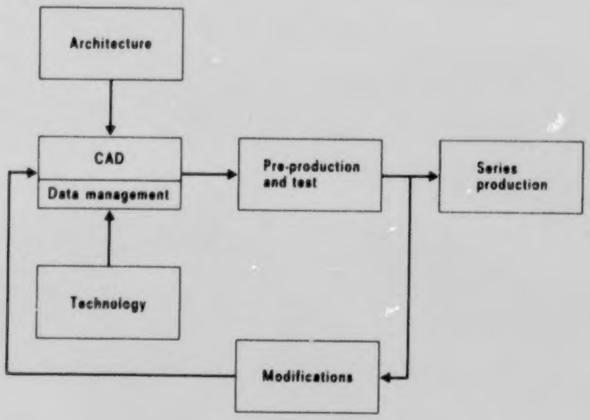

Figure 3: Developing a Computer

DATA MANAGEMENT

The development of a DP system starts with a detailed description of the intended architecture and technologies to be employed, and ends with a complete set of documentation for series production and maintenance.

The documentation of all functional and technical data relies on data management; the stored CAD data can be called up by means of CAD functional programs, via the data management interface. The data is divided into a library, a structured data base and a number of discrete files, and supported by programs for data access and routines for entering, altering and displaying the contents of the data base.

This allows the CAD programs and the data to be matched to one another, by a data structure that takes account of their very different access frequency, range of validity and applicability to the problem. Each item of data is entered only once, to be sure of a coherent stock of data. This data base is held centrally for the entire CAD system, from the first stage of development up to the production and test stages, and is enriched as development progresses, by means of data fed in by hand or automatically, so that the design is constantly refined. The overall growth of the data base is accompanied by checks on syntax, consistency and completeness.

The libraries contain standard data for circuit technology and design, specified at the outset, and not to be altered by the user. These are primarily:

- descriptions of circuit elements
- design desriptions
- electrical parameters
- signs and symbols
- model descriptions for a particular simulation
- data for pursuing error paths.

The data base, on the other hand, contains product data on:

- logic
- layout
- configuration
- history (including all modifications).

These are maintained in step with the development of the product.

The data base structure allows various views of the product. That is to say, the user programs can fetch the contents of the data base either as a signal oriented "network view" or as a chip oriented "block view", without requiring special editing of the data. This is a significant aid to effective operation, especially in the case of modifications.

The discrete files contain the data used and/or generated by CAD functional programs. These tend to be auxiliary files such as:

- functional bit pattern
- control information for robots
- test bit patterns.

The data base contains references to the auxiliary files, so as to be able to assign them to those stored in the data base, and to the correct release. This helps to keep data properly synchronized, and reduces the effort for duplicated organization of data to a minimum.

Logical Design

The first step in designing a central processing unit (CPU) consists in determining which parts are to be implemented as hardware, and which as firmware, meaning the microprograms which are invisible and inaccessible to the user but take over part of overall function of the CPU.

In the past, if the computer had to be restructured for a different task, it was necessary to alter the hardware, which was extremely inefficient. If, on the other hand, the function of a machine is changed via the contents of its memory rather than by means of circuitry, then it becomes possible to give the machine now one appearance and now another, by loading a different program. The firmware microprograms provide the machine with the full range of functions that distinguish it from a calculator, which is capable of only a few basic logical functions.

The tangible result of the logical design is a circuit diagram of the system being developed - an abstract symbolic representation of all circuit elements and the connections between them. The circuit diagram provides a readily understandable and complete description of the internal structure and modus operandi of a circuit. At the same time, it is the point of departure for the physical design, and thus for the data necessary to control the production and test equipment.

Physical Design

The physical design has as its goal the provision of all data and production documents which are necessary for the manufacture of the product in question, and to some extent its testing as well.

In the narrower sense, phyical design includes

- the grouping of circuit elements to form circuits and chips, and chips to form boards
- the arrangement of circuits within a chip, and chips on a board
- the wire routing.

The object of the third task is to implement as many point-to-point connections as possible by means of existing printed wires and soldered pins. If the connections cannot be realized as printed wires on available signal planes, the search program comes into action for discrete wiring.

Production

The production stage proceeds in five steps (fig. 4). The first consists of manufacture, acquisition and warehouse storage of all mechanical, electrical and electronic components necessary to construct a computer.

The printed circuit boards (PCBs), frames and cables are produced in step 2. By PCB is meant the board with its mounted components. The connecting pins are attached by wave soldering to the metallized holes in the board as part of the production process. The pins are then wired using a numerically controlled wire wrap machine, according to a program produced from the data in the production master file.

In the next step (3), modules are produced from the prefinished boards. Examples of such modules are the arithmetic unit, control unit, main memory, power supply and cooling system.

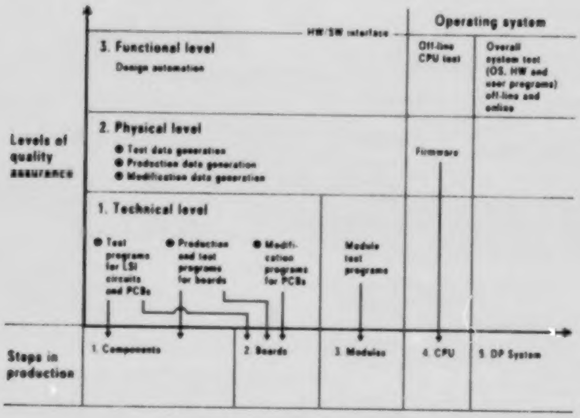
Operating system
HW/SW interface
3. Functional level
Design automation
Off-line CPU test
Overall system test (OS, HW and user programs) off-line and online
Levels of quality assurance
2. Physical level
● Test data generation
● Production data generation
● Modification data generation
Firmware
1. Technical level
● Test programs for LSI circuits and PCBs
● Production and test programs for boards
● Modification programs for PCBs
Module test programs
Steps in production
1. Components
2. Boards
3. Modules
4. CPU
5. DP System

Figure 4: Computer Aided Production and Quality Assurance

The prechecked modules are mounted in racks and wired up to form first processors and controllers, then entire CPUs (step 4).

A functional test and system test of the complete DP system, consisting of CPU and peripherals, constitutes the fifth and final step.

Quality Assurance

Quality assurance runs like a continuous thread through the entire development and production process. Its job is to check the various production steps and to intervene if necessary in order to correct errors at the earliest possible moment, and thereby save unnecessary expense.

Three levels of computer aided quality assurance can be distinguished in the five step production process (fig. 4):

- the technological level,
  in which the application of the computer is tailored to production and test of components, boards and modules
- the physical level,
  in which the test, production and modification programs necessary for hardware manufacture are generated with the aid of DP systems, based on the CAD data base
- the functional level,
  here, on the one hand, the logical design of the CPU under development is simulated in the CAD system, and the state of production is kept up to date in the data base; on the other hand, the programs necessary for functional testing are generated.

The computer aided tests are overwhelmingly technologically oriented in the first three production steps. That is especially true of the power supply modules, which were not amenable to computer assisted testing until complete power supply units had been replaced by individual digital voltage modules.

In the production of the CPU (step 4), the hardware and firmware of the processors and controllers are checked on the functional level using static and dynamic hardware test programs. This is the actual testing process, which begins manually at the operating and maintenance panel, and ends with error free offline run of CPU test and diagnostic programs.

During the last step in the production process the complete DP system, with operating systems and hardware test system, is checked; that is to say, the interactions of hardware and software in the overall system are tested using diagnostic, dialog and application programs.

The checking of test systems has decisive influence on the ensuing series production, since

- test systems, series models and the automatic test equipment are based on the same data base product documentation
- the product documentation (like the DP system itself) has become so complicated that significant modifications must be completed before the model is passed over to production.

The Consequences of a Computerized Society

Constantly rising performances have led to computers of all sizes progressively taking over new fields of activity and work processes which can be formulated logically, and increasingly working together in networks.

New forms of communication technology, such as electronic letters, telefax, videophone conference etc., will widen the range in close collaboration with data processing, and make office life easier. In the private sphere it will be videotex and personal computers which improve access to information.

Only by keeping pace with rapid technical developments can an industrial nation maintain its competitiveness, and ensure jobs for its citizens. This increased computerization, however, means that in the eighties many jobs will change their appearance, as will the qualifications they require. A large number of people working in offices and in management will have to keep up with the changing demands of their work.

At first sight, the extremely fast and comprehensive operation of the hardware, and the complex software with all its ramifications, appear beyond the comprehension of normal mortals. But for all its excellent qualities, computer is only a tool, designed, constructed and controlled by man.

MULTILINGUAL COMPUTERS

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ABSTRACT

The third world nations, our South American neighbors, our North Atlantic Treaty Organization (NATO) and Southeast Asia Treaty Organization (SEATO) members have all entered the high technology era. This, of course, requires their uses of high technology information and documentation. In years past this was not too significant a problem for us since most "high tech" equipments were accompanied by English instructions and/or accompanied by American or European engineers and technicians to help install, train, and maintain the equipment by native personnel.

However, the developing nations are modernizing and exhibiting higher nationalistic attitudes and demanding data to be translated in their native tongues. This can lead to higher-than-expected expenses if not carefully planned on.

The Multilingual Computer Panel of the Advanced Technology Application Stem addresses these problems.

INTRODUCTION

This panel will present three approaches to reducing the severity of this problem.

Linn Downs in the paper "CATing Around the Horrors of Translation" has bypassed many of the older traditional concepts of translation by introducing Computer-Assisted Translation (CAT). This concept although not new has interesting qualities in its application. Language dictionaries are utilized as the "heart" of the system. Significant increases in productivity are achieved through the various vendor-supplied modes available. The CAT is a valuable production tool, but presently cannot replace a human translator.

Dr. Mark Frederickson in the paper "Necessities and Complexities of Multilingual Word Processing" details the special word processing requirements imposed by multilingual documentation, and depicts the special features of word processing equipment necessary to meet the requirements. Future word processing enhancements to assist in translation will also be discussed.

The overall objective of a multilingual word processor is to make text entry and editing as easy as possible. Thus the primary design criteria is to make the edit screen representation depict as closely as possible the final printed document, and to simplify the input of special (non-English) characters. Most word processing equipment do not currently meet these objectives.

J. D. Nilsson in the paper "Producing Translated Publications Without Translator or Equipment" approaches the problem of cost effective translation without a staff translator or expensive hardware and software, or re-keyboarding. This procedure also uses the CAT concept and an optical scanner to produce inexpensive but reliable direct-digitized input to the CAT system.

CAT-ing Around the Horrors of Translation

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Tanslation of technical documentation is a headache that most English speaking managers would prefer to ignore. The very idea of coordinating the production of translated materials can be horrifying; actual sourcing of translation only adds to the terror.

Several methods of dealing with this problem have traditionally been utilized. Well-intentioned companies have sourced translations from the local high school foreign language teacher or better, from the local university. Unfortunately, these sources seldom prove to be as fluent in the foreign language as anticipated and rarely are technically oriented.

Another traditional translation approach is to hire outside translation vendors, usually professional service bureaus. Unfortunately again, these sources are frequently so swamped with other jobs that publication deadlines for translated documentation are pushed back beyond anticipated delivery.

In desperation for timely translated materials, a corporate translation department is established. The company thinks its translation problems are solved, but unfortunately, the internal department becomes swamped with jobs and deadlines are again pushed back. To top off the horror, staff sourcing is difficult (How many Spanish technical translators live in Kreamer, South Dakota? How many want to move there?) and often cost prohibitive.

Having unsuccessfully exercised all these options, the manager makes his final move -- he declares English as the official corporate language. He is happy. He has lived through the horrors of translation; but only until the statement of earnings is issued showing that exports are down and service down time is up. The import department in Germany does not read English and the French service representative does not either. The horror show has started again.

There is a solution to this problem. What is surprising is that it is amazingly straightforward. Many international companies are successfully involved in the technology and purring like a CAT with the results. However, the best surprise is that it is cost effective and can be integrated into an existing production environment. What is this wonder? — it is CAT, Computer Assisted Translation.

Early CAT projects started in the late 40s. A flurry of governmental activity followed and upon the computer was placed the quixotic hope of fully automatic instant translations to and from any tongue. It was only after such absurdities as the Russian to English translations of "out of sight, out of mind" as "invisible maniac" and "hydraulic ram" as "water goat" that the hopes of fully automatic 100% correct translations ran out, as did government funding for such projects.

In the past 35-odd years since the conception of machine translation, three distinct approaches to its mastery have evolved and are being marketed by several vendors.

Typically a CAT system is executed in either a batch or interactive mode and run on a large mainframe or mini computer. Input to the system is performed electronically, by disk, diskette, paper or magnetic tape, optical character reader or keyboarding. Translated output is equally versatile; it is stored on tape or disk, printed, typeset, electronically printed, telecommunicated or microfilmed. More succinctly, CAT can be integrated into an actual production environment.

Examination of the operational modes of the CAT systems available will further clarify their capabilities. However, before individually investigating these systems, let us consider the common element to them all -- the dictionaries.

In the same way that the photoreceptor is the heart of the xerographic process, the dictionaries are the heart of Computer Assisted Translation. Each CAT system is equipped with a general or starter dictionary in the language pairs leased or purchased from the vendor. Obviously not every word from Webster's English dictionary is in this starter dictionary; most clients prefer to customize their own dictionaries with internal corporate phrases and jargon. Word determination is achieved through a KWIC (Key Word in Context) process where documents to be translated are read into the CAT system and are produced on the KWIC listing. Typographical errors and misused words are eliminated, leaving a list of words for which foreign language equivalents must be assigned and then entered into the dictionary. Grammatical coding for each word, i.e., noun, proper noun, verb, can be quite involved or very simple, depending on the CAT system selected. The dictionaries can be prioritized for faster translation processing by assigning words such as "the" or "but" to a high frequency dictionary. Further prioritization can occur within the system by "stacking" dictionaries by product line or sub-subjects. In other words, when translating an article on CAT, the system could be instructed to look up all the words in a "CAT" dictionary, to proceed to a "computer" dictionary for not-found-words, to further proceed to a "Translation" dictionary and lastly to look in the general dictionary. Manipulating the dictionaries in this manner allows the CAT user to optimize and control the system.

Just as car manufacturers offer different models and options, CAT system vendors also offer various language pairs, system sizes, capabilities and operational modes. Briefly, and in no particular order, operational modes can be classified as 1) fully automatic; 2) semi-interactive; 3) fully interactive.

Fully automatic translations are typically run on a large mainframe in a batch mode. Manuscript is read into the system which will translate every item for which there is a foreign language equivalent in its dictionaries. Internal linguistic analysis, based on dictionary coding, will determine verb conjugation, agreement and, hopefully, homograph resolution. After passing through the entire text, the system creates a translated text file which the translator or post-editor can revise from either a CRT or print-out. It is important to remember that revision in this mode is accomplished after the entire text is translated, and then only to the target language file. Because 100% correct fully automated translation does not exist at this time, a post-editor must revise the target output for grammatical errors and style. Post-editing has been reduced by manipulation of the source language before translation, but is still integral to the entire CAT process.

Semi-interactive systems are currently available in the wide size range of the mini-computer. These systems require less dictionary coding than fully automatic systems. Source language text is entered into the CAT system through the aforementioned media. Translations are accomplished on-line, segment by segment. This type of CAT system also attempts total translation of the source text, including inflections, conjugations, agreement and word ordering. The post-editor works with the system on-line at a CRT, revising each segment as the system gives its "best shot" translation. Once again, the post-editor is essential to the CAT-translator team.

The fully-interactive CAT system makes no attempt to solely translate source text. Seated at a CRT, the translator works with the system, segment by segment, to determine homograph resolution and vocabulary selections; items which the system cannot determine during its linguistic analysis. The translator also answers questions concerning sentence structure, thus providing the system with information required to produce grammatically correct target language sentences. Once the translator has provided this information, the system will process the translation, based on translator response. At this time the translator can either accept the translation, modify it or totally reject it and provide his own. In this operational mode, the CAT system depends on information provided by the human translator to perform the translation task. Dictionary coding is amazingly straightforward; parts of speech are entered into the system with the foreign language equivalent. Verbs are entered in their base form. The fully interactive system also is available on a mini computer, the size range within this category offers a wide choice for the potential CAT client.

CAT productivity claims differ from vendor to vendor but a 4 to 1 productivity ratio is the medium. Per word productivity is difficult to assess, due to the varied CAT operational modes. Job turnaround time is increased to about 50% when a CAT system is integrated into a total production environment. Translation costs drop by 20% to 30%. Factors adding to this dollar decrease are translation consistency of vocabulary and style which require less editing. Revisions and reissues are easily accomplished by comparing files, entering the revisions and simply printing on the chosen media.

Language pairs also vary by vendor. Spanish, French and German are fairly standard offerings; Italian, Portuguese, Japanese and Arabic are offered by some and not others. Russian is available on the large mainframe system, due to its governmental usage during the Apollo-Suyez project. If commercial demand for a particular language is apparent, most vendors will plan to develop that new language or will develop a specific language by request. Language analysis and development for CAT requires about two years to produce acceptable output.

The recent CAT advancements and output acceptability are a result of realistic revised goals for language translation by machine. No longer is CAT claiming to replace or surpass the human translator. Artificial intelligence has yet to be programmable to the sophistication required for natural language processing. CAT systems today represent an exciting tool to leverage the productivity of human translators, but never to replace them.

THE NECESSITIES AND COMPLEXITIES OF MULTILINGUAL WORD PROCESSING

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ABSTRACT

This paper details the special word processing requirements imposed by multilingual documents, and discusses the special features of word processing equipment that are necessary to meet these requirements. The paper also discusses future word processing enhancements that will assist in translation.

The overall objective of a multilingual word processor is to make text entry and editing as easy as possible. The primary design criterion should be to make the edit screen representation depict as closely as possible the final printed product, and to simplify the input of special characters. Traditionally, word processing equipment has not met these objectives. However, specialized multilingual word processors are now available.

MULTILINGUAL -- AN EXCEPTION TO THE NORM

In the continuing waves of new word processing systems, multilingual word processing usually gets lost in the surf. Though the computer equipment is flexible, the human programmers (at least in the United States) tend to work with only their favorite character set -- English. There are three reasons: first, the general lack of multilingual fluency in this country; second, the relative lack of computer character set standardization for non-English languages; third, the economic reality that the market for multilingual word processors is small.

MULTILINGUAL COMPLEXITIES

Multilingual text contains a multitude of special (non-English) characters. Most are made-up by overstriking (accenting) while other characters are uniquely shaped (such as "æ").

The ASCII 96 Versus The World

The computer industry has standardized on a set of 96 printable characters. The ASCII character set contains 52 lower and upper case English letters, 10 digits, and 34 punctuation and special characters. Most word processor programs, and almost all printers, are limited to 96 characters. Non-English character shapes can be substituted for English characters. Typing in German, for example, involves substituting the symbol "ß" for one of the lesser used symbols, such as "#". However, to type out ß, one must remember to hit the # button, and remember that a # appearing on the screen will be printed out as a ß.

Accented characters can be accommodated within the 96 character set, but with great difficulty. First, one must substitute the accent symbol for one of the existing characters. Thus "¸" may be substituted for "[", and another symbol (such as"<") would be used to indicate that the next character would be used to overstrike the previous character when printing. The French word printed as "garçon" would appear as "garc<[on" on the screen.

Though life may be difficult containing romance languages in 96 characters, it becomes quite impossible when dealing with other non-European languages. This is especially true when attempting to have text containing more than one language. Dual language processing with radically different character sets (such as English-Russian or English-Arabic) will easily double or triple the number of uniquely shaped characters. Special programming is needed to switch among character sets. Also, extensive re-programming is needed for languages (such as Arabic) that are read in a right-to-left direction.

DESIGN CRITERIA

The avowed purpose of using electronic word processing is to increase the productivity of entering, editing, and printing text. The objectives of a multilingual word processing system are the same. English word processors achieve their goal by taking a simple two-step design philosophy: 1) what you see on the screen is what you will get out on paper; and 2) it is very easy to add to or change what's on the screen. Multilingual word processors should follow this same design philosophy.

Displaying Multilingual Characters

Though it is easy to change the printer's characters (you simply change print elements), it is not at all easy to change the character shapes displayed on a TV-like screen. Almost all word processors have a set of 96 English character shapes defined in the equipment itself. (For those technical buffs, it typically resides in a read-only memory character generator chip which defines the dot pattern used to "draw" each character on the screen.) Some companies allow you to select a non-English character set. An electronic part containing the character set is installed inside the machine. Changing the character set back to English involves opening the machine and switching parts. Not only does this make switching character sets in the middle of a document impossible, it inhibits changing character sets on a day to day basis.

Alternatively, the display can have a number of character sets built-in. In response to a series of program commands, such a terminal would then be able to switch among languages (say from Russian to English and back), all on the same line. Though some terminals have this equipment capability (notably those terminals that adhere to the ANSI X3.64 standard) only a very few word processing programs utilize this capability.

Finally, there are a few terminals that allow a programmer to create virtually any set of character shapes. Instead of buying pre-programmed character sets from the factory, the operator "programs" the terminal to draw a character by filling in a dot pattern on an enlarged electronic grid on the screen. Once programmed, the terminal can recall these custom characters upon command. Typically, up to 256 different character shapes can be displayed on the screen at any one time. These 256 shapes can be selected from a virtually unlimited dictionary of character shapes. This large character set can also facilitate technical word processing, such as mathematical or chemical equations. (For further discussion of this, see the paper entitled *When Will Technical Word Processing Equipment Become as Sopisticated as the Technical Documents Being Produced* in this edition of the STC Proceedings.)

Character Sets -- Standards and Registry

There are no rigid standards for non-English character sets. The International Standards Organization has a system of registering and publishing non-English character sets. However, there are many registered sets for each language (e.g., three for Russian, two for Arabic, etc.). Thus, there is no one standard character set assignment for most individual languages. This lack of standards has retarded the proliferation of multilingual word processors. (That almost no attempt has been made to standardize non-English keyboard layouts won't even be discussed.)

Though it is possible to display non-English characters on an editing screen, it requires special programs and equipment. The additional equipment cost is negligible (approximately $200-400 per display station). The programs needed to utilize these display capabilities are just coming on the market. Since some languages require custom character design and programming, their availability will be limited to a few types of machines.

Text Entry and Editing

The second design criterion involves minimizing the number of keystrokes needed to enter or change a non-English character. It is not enough to display a "ç" on the screen. You also need to enter the character with one, or at worst two keystrokes. Most word processors will handle accented letters as a series of characters. First the letter, followed by a control key to indicate overstriking, and then the character to be used for the overstrike. Thus three keys are used. Not only cumbersome on entry, this method can also spell embarrassment when editing. If a word is typed with an accented letter and then a letter needs to be inserted, the accent may accidently land in the wrong place. For instance, the French word pêcher (to fish) may be a miss type of the intended word pencher (to be bent). Simply adding the "n" next to the e may result in peñcher.

Simple entry of accented or other non-English characters can be easily accommodated on computer keyboards. One need not add a number of new keys. Rather, a simpler method (for the operator) is to use additional shift-like keys.

The shift button allows one key (say a) to do the work of two (a and A). An additional shift-like key can allow one key to have four different meanings. Most terminals have such a key, usually known as the control key. When it is held down in conjuction with another key, the electrical code generated is different than that for either the lower case or upper case letter. Thus a Spanish keyboard would generate n in the normal way, and generate ñ by combining the the control and n key in one keystroke. In this way, accented characters are associated with the base letter key (control c for ç), making it easier for typists to remember keyboard layouts. Newer equipment (such as the IBM Personal Computer) has a fourth shift-like key, usually labeled "alternate." This allows two or more accented characters to be asociated with any key. Again, it takes special programming to associate these shifted keys with particular accented characters.

COMPUTER AS TRANSLATOR ASSISTANT

Beyond text entry and editing, the computer can assist (but not take the place of) the translator. Computer translator assistance may be divided into two categories. The first category involves assistance in displaying dictionary and source materials on the screen concurrently with the translation that is being typed. This essentially adds to the translator's tool-kit. The second category involves semi- or fully-automated translation. This is where the tool box begins to act on its own.

Electronic Dictionary Look-up

A new development is the online dictionary. While the operator is still editing the text on the screen, the computer can be commanded to look up and display translations of words and automatically enter the chosen translation at the appropriate place in the text. The computer is faster than the human at thumbing through a dictionary, and the selected phrase can be inserted electronically (rather than keyed in).

The electronic versions of printed translation dictionaries are not yet commercially available. The programming needed to perform such dictionary look-up has been done -- witness the computerized English thesuarus now available. What remains is converting the translation dictionaries into computer readable format. Once the translation dictionaries are stored in a computer, automatic spelling checking of non-English text can also be performed.

Translators can now purchase the capability to develop their own custom computerized dictionary. This serves as a substitute for the translator's shoe box index file of translated technical phrases. Most translators work with some technical area and have extensively researched certain phrases. When these phrases recur, the translators need only select them from their electronic lexicon, and indicate where the translated phrases should be placed in the text.

Simultaneous display of both the source material and the translated text is possible. Such a display would assist the translator in reviewing the translation for accuracy. To facilitate this, a split screen display would be needed where scrolling of both screens is coordinated. However, the current cost of getting the source material (usually printed text) into machine readable format exceeds the benefit of simultaneous display. If the source document were computer generated and could be transferred electronically to the translator's machine, then display of source and final text would prove economical.

For the dictionary look-up or source/final text display functions to be useful, the translator must compose the translation at the display screen. For the translators who will continue to dictate to a typist, these features would be of little benefit.

Computer-Aided Translation

A much more complex task is for the computer system to attempt direct translation. Commercially available systems attempt to look up all words and match verb tenses. These systems still require extensive human intervention to clean up the computer's first guess. The concept is to have the computer attempt the mundane chores of translation, and then use the translator's time for higher level work, namely verifying syntax and assuring meaning. Only in very narrow applications (with limited vocabulary and syntax) has full computer translation proven even moderately successful. One such example is the translation of Canadian weather reports from English to French.

CONCLUSIONS

Over the past two decades, the computer industry has forced most of the world to adopt English in order to communicate with the machine. Now, albeit belatedly, the computer word processing equipment is beginning to adapt to the non-English speaking world. However, to use many of the computer's capabilities (such as multilingual character display) necessarily involves specialized programming. Such equipment programmed for multilingual word processing is now available along with additional tools designed to assist translators.

Economic Insights has developed multilingual word processing systems that facilitate multilingual text entry and editing as well as designing translator's tools such as the phrase and dictionary look-up capabilities.

HOW TO WRITE A GREAT USER'S MANUAL

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When you're given the assignment of writing a procedure manual for users of a computer-based system, do you feel confident that your audience will be able to understand the system and do their job well? Can you organize and manage the whole documentation project well?

This is a "how-to" workshop to help you become a professional documentor of computer-based systems for the user who is not computer-trained.

HOW TO WRITE A GREAT USER'S MANUAL

o Why Documentation Is Important In A Computer Environment
    - Reference
    - Continuity
    - Consistency
    - Training

o Who Is The User?
    - Definition, Description, Needs
    - Experience Levels
    - Type Of Organization

o A Methodology For Organizing The Documentation Project
    - Where To Start
    - What Sections Should A Manual Contain
    - How To Record And Report Progress
    - Data Gathering Techniques

o Examples of Manual Sections
    - Introduction
    - System Overview
    - Basic Concepts, Terminology and Glossary
    - Information Flow
    - Reports
    - Terminal Instructions
    - Controls
    - Functional Input Sections

o Differences In Documenting Paper Forms And CRT Screens
    - Paper Forms - Batch
    - Batch On CRT
    - Batch Interactive
    - Conversational Interactive
    - Documentation On The Terminal - Good And Not So Good

o Use Graphics In Your Documentation
    - How To Be An Artist Without Being An Artist
    - Some Easy Examples
    - How The Laser Printer Helps

o Conclusion
    - Measuring The Effect Of Your Documentation
    - Professionalism in Documenting

This workshop is a condensation of a full two day seminar. Be prepared to take lots of notes!

COMPUTERIZED READING ANALYSIS

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Formulas for analyzing reading difficulty are being used increasingly by:

- Insurance companies
- Automobile manufacturers
- Government agencies
- Defense industries
- Financial institutions
- Publishing companies
- Schools

The Flesch Reading Ease formula (1) and the Fog Index (2) are two of the more commonly-used formulas. Both of these formulas are based on sentence length and word size:

- Flesch = $206.835 - (1.015 \times W/SN) - (84.6 \times SY/W)$
- Fog Index = $0.4\ [(W/SN) + (100 \times F/W)]$

W = Number of words
SN = Number of sentences
SY = Number of syllables
F = Number of fog words (3-syllable words)

The elements of both formulas involve much counting: sentences, words and syllables. When the counting is done manually, it is slow, monotonous, laborious, and inaccurate.

Computers are efficient at counting. Hence, they can be useful for analyzing reading difficulty. This type of analysis can be performed on virtually any type of computer - from the personal computer to the large main-frame computer. I have programmed my Apple*II Plus personal computer to calculate the Flesch and Fog values. Figure 1 shows a sample report from this program, which was demonstrated at ITCC.

Programming computers to count sentences, words, and syllables can be tricky. Sentences are recognized by the punctuation (. or ? or !) at the end. Words are delineated by spaces and hyphens. Syllables are counted by counting the number of vowels. Exceptions for double vowels, final "e", and other special combinations are not counted. In spite of the idiosyncrasies of the English language, the program counts with an accuracy of 98%. This small error has an insignificant effect on the final Flesch and Fog calculations.

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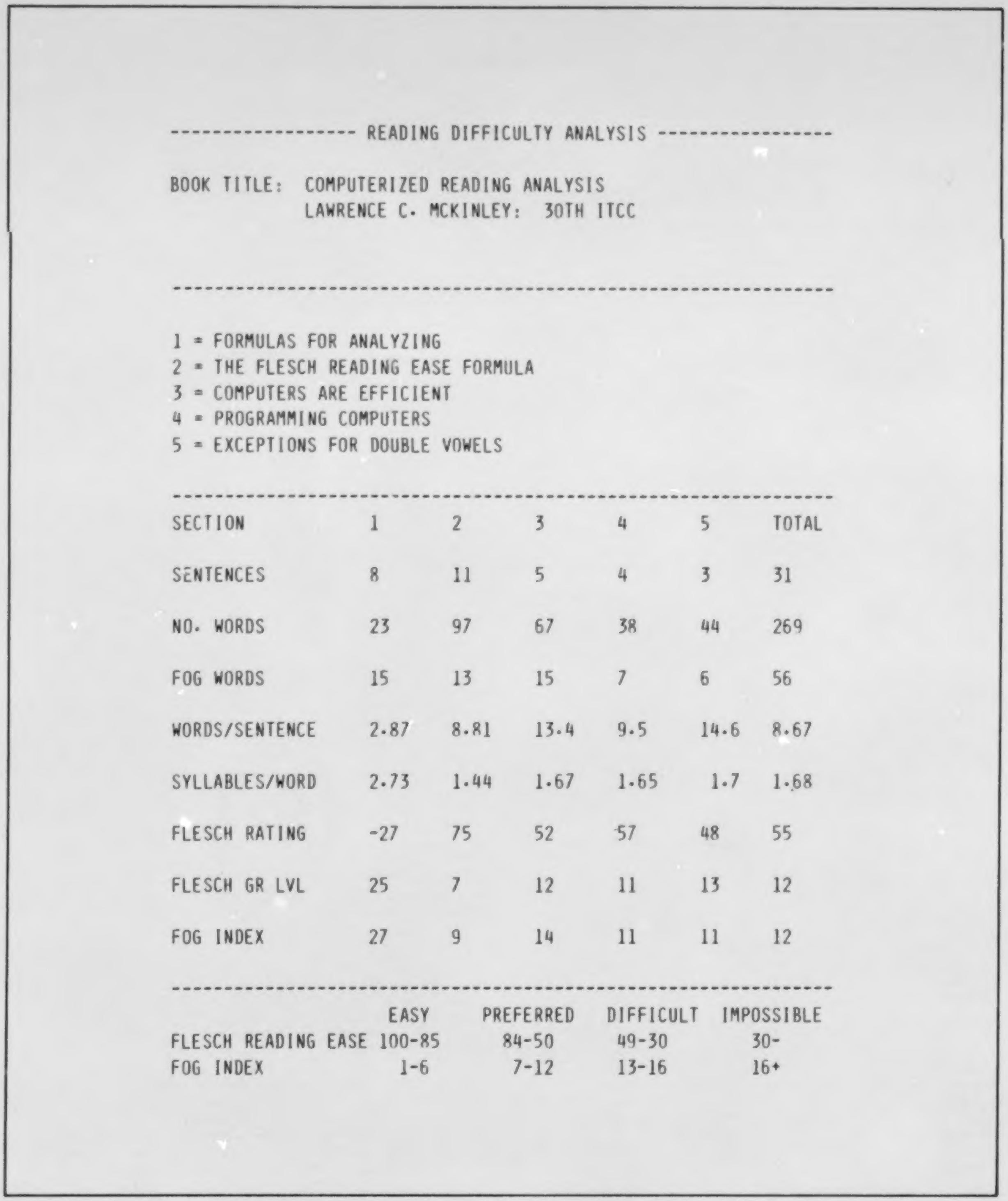
*Apple is a trademark of Apple Computer, Inc.



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----------------- READING DIFFICULTY ANALYSIS ----------------

BOOK TITLE:  COMPUTERIZED READING ANALYSIS
             LAWRENCE C. MCKINLEY:  30TH ITCC


--------------------------------------------------------------


1 = FORMULAS FOR ANALYZING
2 = THE FLESCH READING EASE FORMULA
3 = COMPUTERS ARE EFFICIENT
4 = PROGRAMMING COMPUTERS
5 = EXCEPTIONS FOR DOUBLE VOWELS

--------------------------------------------------------------
SECTION            1       2       3       4       5      TOTAL

SENTENCES          8       11      5       4       3      31

NO. WORDS          23      97      67      38      44     269

FOG WORDS          15      13      15      7       6      56

WORDS/SENTENCE     2.87    8.81    13.4    9.5     14.6   8.67

SYLLABLES/WORD     2.73    1.44    1.67    1.65     1.7   1.68

FLESCH RATING      -27     75      52      57      48     55

FLESCH GR LVL      25      7       12      11      13     12

FOG INDEX          27      9       14      11      11     12

--------------------------------------------------------------
                    EASY     PREFERRED   DIFFICULT  IMPOSSIBLE
FLESCH READING EASE 100-85     84-50      49-30        30-
FOG INDEX              1-6      7-12      13-16        16+
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Figure 1

Information on Display Screens

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Lee Ridgway spent a number of years working as a programmer for IBM and other companies before moving into the field of technical writing. She has managed a writing group for IBM and currently is an information planner, concerned with general standards and guidelines for information rather than focussing on the information for a single product.

Abstract

This paper discusses textual information displayed on a display terminal in interactive programs for introduction, task support, quick reference, and data retrieval. It discusses the limitations and problems of using displayed information. People have habits of gathering and processing information; as a result, some information does not lend itself to online display, and other information must be laid out and written specifically for online display. The key to usable online information is to understand the tasks that the information supports and the users who will do those tasks. Based on that understanding, designs for comfortable interactions between people and computers can be developed and tested.

Definitions

In this paper, **online information** is information shown on a display screen during operation of a computer program. A **display screen** is the display surface (e.g., a cathode ray tube) of a computer terminal. An **interactive program** uses a terminal to display data for a user and to solicit input from a user; the user controls the action of the program through data entered at the terminal. A **panel** is the information displayed on a terminal as a single picture on the display screen.

Uses of online information

Information is displayed on terminals because:

- it teaches the use of a product
- it is the skeleton of the task that the program user is doing interactively
- it is quick reference information for a task
- it is a result of program operation

Introductory and tutorial information. Tutorial information is particularly attractive for an interactive product or system. A "first-use" tutorial leads a user through the tasks performed by the product, explains the processing, and gives the user experience at using a terminal. A fool-proof first use tutorial gives a user confidence; a flawed first use tutorial can turn a user away from an interactive product or teach bad habits in terminal use.

Part of a task. Tasks are more and more frequently being done by cooperation between people and computers. Airline reservations, medical diagnoses, and professional billing are a few examples of cooperative tasks. Effective interaction between person and computer is the purpose of online information display. Technical communicators can contribute to the design of efficient and acceptable communication between person and machine.

Quick reference. When performing a task, such as entering new data or reviewing existing data, a user may forget what command to use, what information the command requires, or what format to type data in. Online reminders (not having to look in a manual) keep a user productive.

Limitations of online information

Some information is good for online display; other information is better read from a book. Problems inherent in online information are:

- information is displayed in short sections
- new ways of browsing within information must be learned
- the time lag between entering data and getting a response can distract the user
- getting online information can interrupt performance of another task.

A display screen gives a limited view. Many display screens show less than one half of a normal typed page; information is chunked into short sections, and the reader sees the chunking as significant to information organization. A long, involved piece of reasoning is broken up by the limitations of display screen size and the mechanics of moving around in the material. Referring between two or three sections of material is not easy.

Going from one display of information to the next can take a noticeable amount of time. If response time is long, it is difficult to remember the end of the previous information until the new information appears; while very short response time may make the reader feel hurried. When the pace of the system and the pace of the user are mismatched, the user feels uncomfortable.

In an interactive program, the human tells the computer what to do and supplies the data the computer is to operate on to perform a task (the set of actions required to meet a particular objective). When a person needs information in order to give the computer appropriate data or instructions, finding the information becomes a secondary, interrupting task. Asking another person is not very disruptive, because talking is a task we often interleave with other tasks. Looking something up in a book is disruptive; it requires stopping one activity and starting to find and read information. However, one can refer to a book without disturbing the main task screen. In contrast, the usual quick reference facility clears the display screen and replaces what was there with textual information, then returns the original display information on request. Seeing both the original information and the explanation requires repeated manipulation, not just glancing to one side.

Using displays efficiently

Information on display screens can be more usable than information in manuals if it is organized for quick retrieval and understanding, if it is easy to get all the pertinent information, and if it is formatted for quick reading. Panels should be made predictable and consistent so users know what to expect.

Contents of material. A distinction needs to be made between two kinds of content: task-supporting panels (data entry and associated reference panels) and output displays that are only to be read. Examples are the airline reservation panels that airline clerks see and interact with, and the arrivals and departures panels on general view.

For task-supporting data entry and reference panels, the contents should be simple, procedural, and immediately applicable to the task at hand. They should contain a carefully selected minimum of information, designed to support a task, rather than to educate a user.

When online information is used to display full text, as a library retrieval medium, for example, contents are dictated by the material. Although users cannot read the material as effectively online as they can from a book, there are times when the convenience of retrieving something online is worth the inconvenience of reading it online.

Organization of material. Material should be organized in a way natural to the reader. Outlines, diagrams, or introductions setting the stage for following material must be easy to understand and remember. (They cannot be easily referred to during reading. A reader's attempt to redisplay them disrupts the normal flow from one panel to the next.) If the reader already has a mental picture into which to fit information, or if you can provide a structure that is easy to remember, readers will not need to look back. To do this, you must understand your audience and their expectations.

Consistent organization lets users know what to expect, what to look at, and what to pay special attention to. If, for example, you always summarize main points at the end of a section as well as at the beginning, users can read the beginning but not feel they need to study or memorize it.

When possible, divide material for online display into panel-size chunks, so that an idea is complete on one panel. Every panel should be understandable by itself. In any case, you should ensure that no sentence is split between two panels, and that a paragraph is split only if it is longer than the panel.

Consistency of functions and panel flow. Be consisitent in how panels are handled. The ways to enter data, move from one panel to another, and access quick reference information should always be the same. If a panel required data entry, the entry mechanism should cause the computer to use defaults for the data. If required data are missing, then the computer should redisplay the same panel **with a message** requesting the data. There should be a single way to quit a task or to go on to the next task in the program. Reference information may be invoked by a special key, a command, or a "?." The same device should always be used. For complex information, there must be a mechanism by which the user can move from one panel to another. The mechanism must be simple, consistent, and predictable. When it is difficult, users avoid using online help information.

Making readable displays

Panels are graphics. The first effect of a panel on a user is pictorial. Users see the layout and the overall pictorial effect before they recognize that there are words. Very strong pictorial effects distract users from content, and they will be remembered rather than the words.

When designing panels, remember that readers are looking at arrangements, groupings, and space use. The effects of color, blinking, and highlighting are important. Overuse of color, intensity, and particularly blinking, can result in a "Christmas tree" effect that totally distracts the reader's attention from content to form. Color frequently implies grouping, that is, two items of the same color are thought of as related. Consistency of use of color and other means of emphasis helps users organize information and lessens distracting effects. Blank space can often effectively separate elements or add emphasis.

Form and appearance. To make panels appear simple and familiar, there should be a small set of formats and these should have a family resemblance to each other. Certain elements should always be present and should always appear in the same place, in the same style. The placement matters much less than the consistency. Establish a panel layout as you would establish a layout grid for a book. For example, every panel should have a title that indicates its purpose and the product of which it is part. Other common elements are:

- Message area -- where error or status messages appear
- Command area -- where commands are entered
- Flow instruction area -- where users' options for continuing are listed (e.g., help, continue, quit)

For particular products, there may be other elements that are common to all panels. Within a product or set of products, the layout for each kind of panel (menu, list, etc.) should be consistent in details, as well as fitting into the general framework for all panels. Again, the precise layout matters less than its consistency.

The basic panel types are:

- Menus and indexes
- Prompting (fill in the blanks)
- Process reference (help)
- Text display
- Lists
- Free-form entry

For a program in which many tasks and functions are packaged together, the user may be guided to a particular task by making selections from menus. A menu requires little recall or knowledge on the part of a user, provided that menu choices are properly worded. Users will tolerate no more than three or four successive menus to get to the right task. For text display, an index serves as a menu, listing the various topics the user might choose. Again, no more than three levels of index should be used lest the user forget the starting place and the goal.

Indexes and menus take more time to arrive at the topic or task than single commands, but they demand less of users, and are therefore particularly useful for products that are not used frequently by any one user. To develop readable menus:

- Use terminology familiar to the user.
- List items in a logical order, such as frequency or order of use, or if there is no more logical order, alphabetically.
- Define items in a one or two word phrase, then describe them in a sentence or two if necessary.
- Identify each item by a number, and select the item by number.
- Align item numbers, item names, and descriptions in columns on the display screen.
- Try to have no more than 9 choices on a panel.
- Provide a way of escaping back to the top level of menu.

A prompting panel resembles a form to be filled in. It should be very clear to the user what information must be supplied, where it should go, and how long it may be. The character marker indicating where a typed character will be placed should if possible be programmed to move from one field to the next automatically. To make prompting panels easy to use, remember:

- People read down a column before going to the next column
- The start of each field to be entered should be aligned vertically, and the field should be delineated by an inconspicuous fill character or a visible field marker. The fill character is better because it shows the number of characters clearly.
- If default values exist, they should be filled in on the panel that the user sees. The user can change them if they are not suitable.

Help information should relate closely to the panel from which it is called. The best form of help is probably an explanation of a single field, overlaying part of the panel but allowing the user to enter the information while still having the help information displayed. Another good form of help is a new panel that explains the contents of the panel (or field) and has a place for the user to enter information while still looking at the explanation. A panel or set of panels that provides background information for a panel but does not permit a user to enter data is not as satisfactory. To be readable:

- help should not split paragraphs between panels
- help titles should relate closely to task panels
- help should not overload the user with information
- help lines should be no more than 50 spaces long
- help text should be centered
- on a help panel, an example must exactly follow the typography and format of the original, including color, intensity, and letter cases.

Text display may be a display of text to be read or manipulated. Text retrieval programs illustrate the former and text editors the latter. Text displayed to be read has been retrieved from a text data base, and has usually already been formatted. If text is being created for display, there are a few considerations for formatting:

- Use both upper and lower case letters for text. You can use color or intensity to distinguish level of importance, but you must explain your conventions and remind readers of them repeatedly. Indention, although more natural to readers, is hard to distinguish from panel to panel.
- You are often unable to put graphics on a screen, therefore you need other ways to liven up the presentation of text. Blank lines between paragraphs, short paragraphs and short sentences, and judicious use of highlighting or color for emphasis, attract readers.

When text is presented for manipulation, it is the user's responsibility to format it for easy handling.

Lists can be used as menus, where the operation to be performed has already been defined, and the list shows the possible operands. Lists can also be a form of data entry panel, where there is space beside each item to specify an operation. The text on which an editor works can be considered a list of lines. The identifying quality of a list is that it is composed of a series of items that are alike in format and can be used in the same operations.

Present lists in columnar format. When each item has only one field, you can display up to five columns of items. If items contain several fields, put the fields in columns across a line. If items are more than one line long, display them in a vertical format, using indentation as necessary to show field relationships. Display no more than two columns of blocked items, and prefer one. Separate each group of five items with a blank line, to facilitate reading across the line for one item.

Always have a title for the list, and be sure to tell the user how to look at the rest of the list (if it is long), how to select an item (or operate on an item), how to quit, and how to get a further explanation. Title each field, if possible, and in help, provide an item and field explanation for each type of field or item.

Language and style. The human views the computer as a working partner, and attributes a personality to the computer. The style of text and graphics provides the basis for the perceived personality, along with characteristics such as the time between the human's entering data and the program's response. To make the perceived personality acceptable to the program users, you must either make the program compatible with the users, or you must make sure that the personality is not very noticeable. Because you usually have a mixed set of users try to make the program unobjectionable. Ways of doing this are:

- Restrict vocabulary to common words or words related to the tasks.
- Avoid humorous phrases.
- Do not scold or nag the user. "I did not understand" is preferable to "You did not say."
- Use both upper and lowercase letters.
- Be positive. Tell the user what to do to correct a problem.
- Use the active voice.
- Use short sentences, but do not be telegraphic.
- Avoid abbreviations and contractions.
- Be consistent in word use. Do not use two names for the same thing, or use the same name for two different things.
- If a user repeats a mistake, give a different error message the second time. The first one obviously was not adequate. Give more information, or say how to get more information.
- Always tell the user how to stop. There is nothing more frustrating than to be trapped in a program because you do not know the correct response and no other will do. (That's when people turn off the terminal whatever the consequences.)

Determining content

Deciding what detail to put into panels depends on the users, the frequency with which a program will be used by a single person, and the complexity of the program. The best way to find the correct level is testing. Start with a skeletal set of menus, prompts, and helps, and have people try to use them. Start with people in the project; they will find some gaps and errors. When you think you have usable panels, invite future users to try them out. Their questions and confusions will show you what is missing or ambiguous. They will also tell you what is unnecessary.

Consider the least verbal and least sophisticated expected users. They will have the most trouble learning and using the program, and they will have the most trouble correcting their errors. They are also least likely to use help facilities or manuals.

Help is most often needed for filling in fields, when you forget what is supposed to be filled in. (Is a name to be entered "first-name last-name" or "last-name, first-name"?) You are likely to ask a nearby person. If no one can help, you ask the machine through a help facility, or you consult a printed document. If you trust the machine, because you get good answers, you will continue to use help. However, if help gives you too much or the wrong information, you learn not to use it. Everyone has been annoyed by getting too much more or less relevant information, and learns to avoid the people, books, or programs that overwhelm them.

Trading off convenience and speed. For speed of operation, the user should go through as few panels as possible. But crowded panels are daunting to a new user, and they are more likely to be incompletely or incorrectly filled out. As a general rule, have no more than three levels of menu, and no more than 15 data items to fill in on a panel. For experienced users or specialized users, have fewer, fuller menus and fewer, fuller data entry panels.

Defaults speed up data entry, and are valuable to new users; when too many fields are defaulted, however, the program may perform a task other than the one the user wanted done. Deciding what cannot be defaulted depends on the tasks and the user set. For example, it may be desirable to establish a threshold for defaulting, asking for confirmation before continuing if more than half the fields are defaulted.

Allowing a user to enter commands rather than choose options may shorten the process of starting a task, particularly if the user can define "supercommands" that do several commands in succession. Such a facility is good for experienced users, but it is not recommended for new users.

When users may enter commands, you may allow them to use short forms of commands, so as to speed up command entry. Be sure, however, that you do not make it too easy for a user to destroy previous results or input data. One keystroke should never start a process that cannot conveniently be stopped or undone.

It is dangerous to allow users to control task flow by calling up panels by name, because there are no safeguards against user error. Normally, the user is better served by linear flow with menus at choice points.

The difference between new and experienced users can be handled by a profiling ability allowing a user to use a fast path or to step all panels. Since both a profile capability and fast path processing require additional programming, there is a tradeoff between ease of use for different users and size, cost, and complexity of the programming.

Summary

In summary, the process of designing and presenting good online information and good interactive programs can be outlined as follows:

- Define the goals and objectives of the program. Consider who will use it, what they will do, and what the results will be.
- Establish conventions for:
  - Layout
  - Functions
  - Use of color
  - Use of other visual emphasis (reverse video, highlighting, blinking)
  - Use of other attention devices (alarm, etc.)
- Establish vocabulary, special terms, approved abbreviations.
- Be constantly aware of the program's appearance to the user.
- Expect to do several cycles of testing and changing.

More Online Computer Documentation in the Future—Are You Ready?

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As the trend toward interactive software grows, so does the trend toward online documentation. As professional communicators, we realize that online computer documentation has different characteristics from traditional, printed technical information. We are learning that the approach, content, structure, format, and usability require special consideration. This paper describes what one writer learned about these special considerations and her experience with creating online documentation.

A New Challenge

Are you ready to be part of the new wave of online documentation that is emerging in the computer industry? This new wave is a result of an increase in interactive software designed for a special kind of computer user—one not trained in programming.

Unless you are one of the few who have already done this new kind of writing, you are probably wondering: What is online documentation? What must I know to write it? I was asking the same questions until recently when an assignment to write online information motivated me to find out the answers. Perhaps what I learned can help you when your assignment comes.

Learning About Online Documentation

When I was given the assignment to write a user's guide and some "help screens" about an interactive computer program, I was not even sure what I was being asked to do. None of the writers I knew had written online documentation or could tell me exactly what it was.

The chief programmer on the project, however, told me that a help screen is a list of essential facts that a programmer needs for working with interactive software, like operands, parameters, and syntax. He got his ideas from seeing help screens that programmers had written for themselves, listing facts previously found in reference books. This online information was obviously for trained users, who needed only reminders of facts they already understood.

Not feeling sure that I knew enough, I next questioned the human factors engineer who was working on the project. Her idea of online documentation was something she called "tutorials." Like lessons with the computer as teacher, tutorials are used to teach programming and other subjects in schools. This approach generally begins with text to read and then presents quizzes, which users respond to at the display terminal. The information is usually geared not only to teaching various subjects, but also to teaching the untrained person not to fear computers.

The ideas of the programmer and the human factors engineer demonstrated the wide range of types of online documentation. It was clear that online documentation is not simply a matter of writing a manual and putting it into computer storage; I had to make a lot of decisions about the product I was documenting and the audience I was writing to.

Looking for Guidelines

The next thing I did to understand my task better was to look for guidelines about creating interactive products. I was able to locate guidelines about how to create the interface, or working connection, between users and interactive software. While dealing mostly with programming and the design of task screens, these guidelines made me aware of the design of my help screens. *Task screens* are used to perform a task, by filling in information, selecting options, or choosing from a list. *Help screens* explain what to fill in and how to make those choices.

The guidelines divided the task screens into several types, according to use, and emphasized keeping format and content consistent among screens. From these guidelines I gained a new consciousness of the purpose of the task screens I was documenting.

At the time I researched the guidelines, I found no discussion of color; however, a subsequent revision of those guidelines recommended using color consistently and meaningfully. For instance, use blue for all data entry fields, red for messages, and white for fields that contain unchanging text.

Sorting It All Out

After I had talked with the people on the project and read the existing guidelines, I realized that online documentation was different from printed documentation in some key ways. Special thought must be given to approach, content, structure, and format. In addition, for each of these I had to consider human factors.

Approach

To me, the important questions about what documentation approach to take were these: Do all types of task screens require the same type of documentation? What information should be printed and what should be online? How informal can the online documentation be?

I learned that a task screen in interactive software is generally either for selection, entry, list, text, or conversation. The selection screen, sometimes called a menu, asks users to select the task they want to do from a list of options. After the user selects one of those tasks, very often either an entry screen or the list screen is displayed. The entry screen asks users to type in information, while the list screen asks users to select from a list; both of these actions instruct the computer to complete a task. The text screen usually displays useful information but does not ask users to do any work on the screen. Perhaps the rarest is the conversation screen, which allows users to type commands, questions, and responses to the program.

Studying my project in light of these categories helped me clear away initial confusion and sort out my writing job. I determined that the program I was documenting used selection, entry, list, and text screens. Because the user's action for each screen is different, each type of screen needs a unique approach to its documentation.

For the *selection screen* the help screen must explain each option and the tasks users can do by choosing them.

For an *entry screen* the help screen must explain the task users perform with the screen, explain each field on the screen, and list the rules for specifying valid answers.

For the *list screen*, the help screen must explain how to select, how many selections are possible, and in some cases, what the selections mean. Besides these points, it should explain what happens to the items selected.

For the *text screen*, the help screen must explain how to use information on the screen.

Although I did not have to write about a *conversation screen*, I believe its help screen must tell users the choices of commands or responses, the syntax to use, and the rules for conversing.

For all types of task screens, the help screens must also explain how to return to a previous screen or move on to another task screen.

Another important question of approach is what documentation should be put online and what should be printed in traditional manuals or reference cards. I made part of that decision when I analyzed the types of task screens and decided what kind of documentation each needed. I also had to decide whether to limit online information to specific instructions about data entry fields or to include general overview information.

The last question of approach concerned how friendly the online documentation should be. Because online space is scarce and because a friendly approach for me requires more space than a terse one does, this was a critical decision. I decided that friendliness was worth the space. I believe it is important for users to feel that a person has written all documentation—whether that documentation is help screens or a manual. Therefore, I purposefully used second-person pronouns, active voice, and imperative mood, and I began the first screen with "Hello."

Content

Because of limited space, online documentation must be efficient in telling users how to do the task. The writer of online documentation must ask: Is one version of online information enough, considering the user starts out a novice and becomes an expert? *Can the online documentation completely replace a user's guide?*

Usually, both *trained and untrained people* use online documentation. When beginning to use a new program, even an experienced programmer is an untrained user on that particular program. Of course, all new users need to know more background information, product overview, rules, limits, and specifics. But, as users gain experience with the program, they need only occasional reminders of specific information. How then can a writer meet the requirements of both audiences?

One way is to write a long version for first-time users and a short version for the experienced. This solution requires that users be able to request the form of documentation they need. Another way is to write one long version but format it so that expert users can easily pass over information they don't need and find what they do need.

For my project, I solved the problem the second way. I began each help screen with a general explanation of the tasks users could perform on that screen and then wrote specific instructions about each option or field on the task screen. I formatted the information so that untrained users could comfortably read it and so that trained users could quickly find a specific topic without reading everything.

The question of whether the online documentation replaces a user's guide is one, which each writer must answer based on the program being documented and the purpose of the documentation: to teach, to describe, or to remind. The content of my online documentation grew in scope as I worked on it. I began to see that an online glossary and index were appropriate and convenient. The background and overview information the users needed also fit into the structure and scheme of the program. Because the program was not very large, I believed that putting normal user's guide information online was even more convenient for users. I was also able to add information on how to use the glossary and index.

While putting those items online seemed logical, putting other items online did not. I knew that users would need information about getting started, a map of the screens, and an example of a typical procedure to follow in doing their work. I tentatively decided to create a poster for users to hang on the wall by the terminal, containing a map of the program. The map would contain the task screens, help screens, and the paths between the functions. The information about getting started and how to do a sample procedure could go on a reference card inside a pocket, hung on the side of the terminal.

Structure

With decisions made about approach and content, perhaps the next most important consideration is structure of the online documentation. Is it appropriate to have a one-for-one correspondence between task screens and help screens? How do users gain access to the online documentation? Should users have a choice about how to gain access to online documentation?

For my project, a program function (PF) key already existed that accessed help information. I wanted to structure the information so users could learn fast, complete their tasks fast, and experience less frustration.

Therefore, while I had the freedom to create boundless online documentation, I subordinated that freedom to the cause of consistency and predictability. I decided to write one help screen for each task screen. The help screen would be accessible by pressing the HELP key, PF1. Because the interactive software provided no way for users to skip quickly through the levels of screens, I thought that fast movement through the help screens was essential. The programmers agreed to make it possible for users to move from one help screen directly to any other help screen without going through task screens. Users have only to type the coded name of the help screen they want and press the ENTER key. (The code names would be available on the map of the program.)

Additionally, the programmers listed an option on the main selection screen of the program, through which users could get general information about how to use the program and how to gain further access to its help screens.

Also to be decided was whether to allow users to place the cursor on a field and press the HELP key to get specific information for that field. The programmers coded this "field-accessible help," but in the end we decided that for this small program it was no more useful than screen-accessible help. Therefore, each task screen had only one help screen, one that could be scrolled when all the information would not fit on the screen at once.

Format

Having made decisions about approach, content, and structure, I began to document some task screens to get an idea of what form the information would take. By writing a few screens, I saw a pattern emerge in the information and format. I tried several formats for the screen, to discover which was easier to read. My questions were: Are the techniques of formatting on the screen the same as for the printed page? What margins and spacing are easiest to read on the screen? Do normal paragraph length and line length apply to the screen?

I experimented with information on the screen: text blocks, varied column widths, line justifications, line lengths, and paragraph sizes. I found that filling up the screen with text made reading tiresome. Right justification made following from line to line difficult. Paragraph length seemed especially critical because this product would be used with two types of terminals, both of which have small screens; paragraphs half the normal printed length are easiest to read on the small screens.

Although guidelines stressed the importance of completing a sentence on a screen so that users do not have to scroll forward to finish a thought, this is not always possible. The interactive software I documented allowed users to change the number of lines scrolled at one time, so that sentences and paragraphs might be broken at any point.

After much experimentation with formats, I decided to use an offset style with the names of the fields or options listed on the left side of the screen, and paragraphs of information about them on the right side. This format not only allows experienced users to find a specific heading quickly and ignore general information but also gives visual rest to all users.

Other formatting tools available on the screen are uppercase, underlining, color, and highlighting. For my project, I used uppercase characters and underlining as formatting tools visible on both color and noncolor terminals. The programmers decided how to use color and they used green exclusively for all help information. Because highlighting is easily used in excess, the programmers used it sparingly, I not at all.

Human Factors

While I was learning about online documentation and writing it, the human factors engineer advised the programmers and me about creating meaningful names for the screens and using color. She also tested my documentation for usability.

Testing of the documentation was invaluable. From it I learned that the wording of a sentence can dramatically change

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the way users work or feel. I learned that more information was needed on the reference card than I first planned, to help users feel at ease and get started with the interactive screens. Most importantly, I learned that the poster idea was not a wise one. People in contact with customers advised me that, while the poster showing the map of the program was large and attractive, and easy to use, many terminal users would not have space near their terminals to hang it. To solve that problem, I decided on a new format for the printed information, which complemented the online documentation: a standing card that could be placed beside or on the terminal. Shaped like a pup tent, this card could have the contents of both the poster and the reference card printed on it.

Thus, in final form, the online documentation included a help screen for each task screen, general information, and a glossary-index combination. The printed documentation contained the map, start-up information, and a sample procedure.

Are You Ready?

Perhaps my experience can help you when your assignment comes to write online computer documentation. As you write your online documentation, make your decisions carefully. Let the content and purpose of task screens determine the content of your help screens. Think of your users when deciding whether to have multiple levels of help information, multiple methods of access to the information, or skipping among screens. Consider various ways of supplementing the online documentation: books, posters, reference cards, tent cards... Make certain that use of color, format, structure, and content of screens is consistent and meaningful.

I hope you now feel ready to meet the challenge.

STRATEGIC PLANNING FOR TEXT PROCESSING: HOW TO PROCEED

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Strategy is the combination of thought and action. Strategic planning not only sets a direction for action but requires implementation to succeed. Planning for text processing in the new technical era needs procedures that build on traditional planning approaches but that also go beyond them to recognize special problems. The article lists strategic planning steps, warns about specific problems in planning text-processing development, and suggests a productivity rationale for undertaking the strategic planning process.

WHAT IS STRATEGIC PLANNING?

Strategy is an old word from the Greek term strategos, which means "general." Strategy at base therefore is the art of generalship. In its modern meaning strategy represents leading an organization so that it:

1. keeps from being destroyed, and
2. achieves its objectives.

Strategy means more than simply planning, which is the conceptualizing or mental projection of an action. Strategy is directed action, the combination of thought in action. The real difficulties in achieving such combination are why effective strategists are as valuable and rare today as winning generals in time of war.

Strategic planning begins with the setting of a direction. It only makes sense when it is connected with implementation, the action that carries the direction into existence. Planning is like the magnetic compass, which only travels if you carry it but which gets you where you finally want to be.

THE PROBLEM OF TEXT PROCESSING DEVELOPMENT.

Text processing technology is not simply a passing fad. Its impact is so extensive because text processing is a way to improve across-the-board office productivity. Since the application of computers to text processing in the middle 1970s, entire industries are having to alter their views of their work and of themselves. The computer industry has had to change its own view of itself: we no longer consider data processing and word processing to be separate endeavors, rather as components in a larger field called information processing, or information management. Basic changes occur in offices when text processing equipment is installed. I believe that the impact of text processing technology will surpass that of the typewriter or the telephone, when integrated information management equipment begins to be broadly applied.

The trouble with the development of text processing has been that it is a new field, without clear precedence of procedures and responsibilities. There is a great deal of action taking place in text processing development; the power of the logic behind it, on the other hand, is not always evident. Nowhere is strategic planning more necessary than in the effort of an organization to direct applications of breakthrough technology.

STRATEGIC PLANNING FOR TEXT PROCESSING: HOW TO PROCEED.

I will not attempt to give a lecture on the strategic planning process. There are a number of excellent sources that provide specific methodologies. We have incorporated ideas from Levy, McCredie, Miner and Steiner, and O'Connell. (See Appendix.)

Rather than duplicate other sources in the field, I will simply list here the steps that we have found most useful in approaching strategic planning in our organization.

1. Evaluate the Organization's Needs. The organization should undertake a firm definition of its role. It should have a clear idea of policy management's goals. It should understand the demands of its management and of those it serves. It should have a broad-based understanding of its mission, its reason to be. While these necessities are taken for granted, in many organizations it appears that these changing needs are only understood by a few individuals and then not communicated to the rest of the organization.

2. Determine How the Organization is Satisfying These Needs Currently. This is the current situation analysis. Some strategic planners suggest an internal audit, and what is called a WOTS-up analysis, that is to say,

determining the Weaknesses, Opportunities, Threats, and Strengths that affect the organization.

In my opinion what this really means is a review of the internal situation (your strengths; your weaknesses) and of the external situation (your opportunities; threats to your organization). Like a general, you must determine what you have going for you, and what you're up against. You must assess the positive and negative factors that will influence the actions you can take.

3. Define Your Organization's Specific Problems in Text Processing. Levy suggests (p.3) that the planning team emerge with specific products by this stage of the process:

3.1 A clarified and manageable set of information systems problems;
3.2 An assessment of current information support to and for the organization;
3.3 Data that validate or test the team's analysis in the second stage;
3.4 A set of non-information-related problems to give separately to management.

Non-text processing problems will emerge from your evaluation and analysis. They of course will be of interest to the organization but channel them out and focus on text processing issues unless the other problems are inextricably bound in.

4. Develop Realistic Strategy Development. In my view, strategy development is the most important step in strategic planning. This step is the actual generation of the plan itself. There are three major steps in strategy development:

4.1 evaluate alternative solutions;
4.2 recommend solutions as site-specific applications;
4.3 outline implementation strategies.

Community planners know that "one choice is no choice." In order to develop effective strategy you must have alternative solutions for your problems. Therefore, text processing strategists must know the state of the art in text processing technology.

The strategists must also know management and organizational procedures to solve problems. Some information-processing problems do not require technological solutions--it is important not just to throw more hardware into the organization in an attempt to solve problems.

5. Recommend Solutions as Applications. The question for the planner is "What do you apply as a remedy or solution to the problem you evaluated in the earlier steps?" This step in strategy development is where organizations fail that rely on vendors to find solutions for them. It is not enough to say that a communications package would help distribute information between workstations. That is thinking; applying the package to your specific organization constitutes strategic action.

6. Outline Implementation Strategies. The actual path of implementation step by step is not necessarily the task of the strategic planners any more than it is the task of the general to actually participate in a tactical maneuver. Indeed, it is sometimes counterproductive for him to inject his presence and authority into a specific situation, since his presence will dilute the authority and initiative of the local leadership. Still, the groups that actually must perform the implementation of the overall plan need a general outline and sense of the plan's direction. The action must also be something the groups can live with if not support.

7. Prepare an Effective Communicaton of the Plan. Normally, there are two stages in the communication of a strategic plan, a written report and an oral presentation.

The written report should contain an action plan for text processing. Many of us have seen planning documents that contain no call to action, no guide for action, only passive generalities as to what ought to be done by the next planning committee. The effective report should contain a clear set of recommendations on how to implement the actions you recommend.

The oral presentation will inevitably disappoint you. You will find that with some few exceptions no one has read your plan, the questions they ask will be simplistic, and instead of moving forward from where you are you will be asked simply to review the major conclusions and recommendations of your report. Discouraging as this may appear, your presentation itself may inspire your audience to return to the report.

HOW SHOULD THE PLANNING TASK GROUP WORK?

Strategic planning takes very large amounts of thought, energy, and most of all, time. Almost every planning group that I have ever heard of underestimates the amount of time it will take to develop the strategy its organization requires. Typically, weeks or months are spent in preliminary meetings; clarification of the work comes slowly; and finally there is what we not so humorously call a "flail." That is when the people who actually have to write the report furiously pull together the committee's work into some coherent, if idiosyncratic, strategic plan.

Coordinating the process through a group chairman with real authority is a much preferred approach. The task group should break down its evaluation and analysis work into subtasks that are an individual's responsibility. Meetings then can be devoted to synthesis, bringing the participants up to date on the subtask information. Writing should be under way at the same time as data gathering--the group shouldn't look for a synthesis by individuals at the end.

Despite the efforts of planners to evolve a technical vocabulary that reflects the complexity of their field, management planning and policy formation rest simply on the meeting of minds. The problems and ultimately the solutions have to be defined by a meeting of minds at the decision level. Words have to mean the same thing to all the participants in the strategic development process. Your plan can be as detailed, specific, or comprehensive as you like, but two major constraints limit your scope: the time available, and your mandate from your organization.

PLANNING TEXT-PROCESSING DEVELOPMENT: WARNINGS ON SPECIFIC PROBLEMS

Text processing planning has its own specific problems that need to be taken into account, beyond the general problems associated any organizational planning.

1. Maintain the Real Task: Weighing Your Organization's Needs. The most important task to maintain is the old advice, "know thyself." Planning groups in this field tend to have an interest in the computer technology itself--they want to know the technology. There are good reasons for this emphasis: learning about the technology is relatively easy; it is more glamorous than in-house work; vendor demonstrations are like school field trips in that they bring a welcome break in the daily routine; vendor salespeople are most friendly and solicitious. Yet without knowing your own needs thoroughly, your organization is at the mercy of a vendor who sells you what he has that come closest to filling what he perceives to be your needs.

Weighing your organization's needs is to become involved in its fundamental operating dynamics. You quickly run into political problems, into the borders of empires. You may find that even significant authority does not help you here; you may be dealt with as has many a fact-finding panel visiting a distant country--the facts that you are allowed to find will not necessarily be the ones that you were looking for. You may run into hostility or become the target of resentment directed at the upper management.

In this field you may find some technology resistance in some members of the organization--usually senior staff members. Some technological fear will occur in everybody, including your own planning staff, if you're honest, and wise.

If you stay on the task, however, the fear can lead to an informed caution, that when you finally generate your recommendations they may be in the best interest of your organization.

2. Guide the Planning Process: Temper Word-Processing Mania. Text processing gets everybody excited; the more people know, the more excited they may become, as the applications of the equipment become more clear. Many people get swept away in a kind of shopping-list enthusiasm. Because text processing has such broad applications, you may find that everybody is in the act. Everybody's favorite computer company just happens to be the one most appropriate to your use. Since the technology has now been installed in many companies, many people measure text processors based on their own experience with one or another brand. It is perhaps human nature that everyone measures the market based on what they know best, often the machine on which they first learned text processing.

A problem with the clerical application of text processing is that many secretaries, lacking an overview of a department's or entire division's operations, apply new text processors simply as supertypewriters, using the machines to do more quickly and easily the same kinds of jobs that their typewriters did previously. This approach is a good beginning but leads into the next two problems.

3. Avoid Minimal Scope: Text Processing Means All Keystroke Production. Considering text processing to be simply computer-aided keying shows a logical misunderstanding of the purpose that computers serve in informaton processing. A keystroke storing a symbol on any medium is still a keystroke. Every stroke in key entry work raises production costs incrementally. The new technology allows us to integrate our information procedures, and there is a place for many kinds of key entry devices. It is the task of the text processing planners to outline procedures for such integration.

The planners must also realize that text processing, when finally applied, often overwhelms the systems. At the University of California, using a time-sharing mode, the computing center has had to add minicomputer after minicomputer to match the demand for text processing. At the Rand Corporation, a mainframe computer is completely dedicated to text processing, while a second handles only data processing.

4. Leap With the Technology: New Eras Demand New Thinking. Text processing technology is new, so it requires new ways of thinking, new applications. Just as many secretaries think of text processing computers as supertypewriters, so too planning groups can fall into the trap of assuming that the future resembles the past. In fact, in my opinion, the new computer technologies will actually transform our ways of doing things, with even greater impact than typewriters or the telephone.

As an example close to home, at the Colorado School of Mines we have essentially failed to implement Optical Character Recognition (OCR), because using the equipment requires new ways of inputing on the typewriter. The implementation of OCR has been so painful and accomplished with such little campus-wide training that we are essentially using a very expensive machine for a storage table today.

5. Beware False Clarity: Text-Processing is Absolutely Complex. The mathematician and philosopher Pascal once wrote in a notebook "too much clarity darkens." Later he did not

understand what he had written, and charged the word "darkens" to "dazzles." Pascal was right the first time. Clarity is not always a virtue--things may be clear because they are oversimplified, not because they are brilliant.

Text processing technology is complicated. It is no accident that natural language computer applications followed numerical data processing. The systems of logic and syntax in natural language are less discrete and easy to manipulate with electronic devices.

Text processing applications mean fundamental changes--work will be affected in new ways. The applications are very broad. Implementation in the organization is complex; it will take time and affect people and procedures in ways you cannot forsee. It will inevitably take time for the new ways of operating to be clear to the participants and to the planners.

6. Prepare For Inaction: Implementation Becomes the New Problem. No matter how fine, your management may grind exceedingly slow.

Planners are really advisors and must face the reality that nothing may come of their efforts. The model of Presidential task forces comes to mind. Often the assignment of a task to a planning team is only a political move and its efforts are essentially irrelevant to the policy-making decisions.

One major difficulty planners face is convincing or pushing upper management into recognizing and implementing their recommendations. Inevitably there is a difference of perspective between the groups, and the planners must recall that their view of things comes after day-to-day engagement with the problems and various solutions.
Therefore, planning documents must also be educational, in that they must bring the management to the forefront of the problems in very little time.

WHEN INTUITION FAILS: WHY WE SHOULD BE PLANNING PRODUCTIVITY

Management approaches to problems are often incremental and the solutions are based on a slight change of procedure or policy over what has gone before. At least in the area of computing technology and information processing, the pace of change is too rapid and the problems are too complex for individual intuitive response. Task groups will be necessary to keep up with the field; more training of managers in strategic planning will be required.

There are large shifts in the computing industry now. Stanford University's Center for Information Technology expects that not only will data processing and text processing occupy a large amount of computer time, but that much reading will also be accomplished by terminals and not with as great a reliance on paper as now. The professional workstation concept will transform the work of a great many jobs in current industry. The new technology may cause even greater problems in organizations--bringing in new equipment to a badly organized office may make things worse.

Probably the best thing that has recently been said about office automation is by Bruce Hasenyager:

> The technology of the automated office will amplify the behavior of the people working there. It will allow good managers to manage better, insightful professionals to contribute more, good support staff to support more, and effective teams to synergize more easily. It will also allow confused managers to obfuscate situations more thoroughly, bad leaders to charge off more rapidly in the wrong direction, fools to make their foolishness more quickly and more broadly known, boors to be more boorish, and bores to be more boring. (Quoted in Kenneth Klee, "Wanna Bet?" Datamation, 28 [September 1982], p.165).

Hasenyager's observation makes clear that computer technology is no miracle worker in itself--indeed, it is a behavior amplifier. For effective managers, the message is encouraging. Productivity gains are possible, and with effort, can transform the organization.

In our planning, we concluded that text-processing technology increases productivity four ways. It:

1. Increases individual productivity.
2. Makes overall office paperwork processing more efficient.
3. Improves document quality.
4. Provides the impulse to innovate.

The last way to increase productivity--the impulse to innovate--signifies the most important contribution the computer revolution offers us. New technology allows us, requires us, to shift our thinking and our actions. Combining our thoughts and actions effectively to meet the thrust of the new era becomes our strategic problem. For strategic planners, this changes into our great opportunity.

APPENDIX: SOURCE WORKS ON TEXT-PROCESSING STRATEGY

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ENGINEERING DOCUMENTATION
AUTOMATING THE WRITER'S INPUT

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The engineering writer has the responsibility for creating product documentation from its inception. A tremendous amount of pressure is placed on the writer by the organization to produce and maintain accurate, up-to-date, and timely documents. These responsibilities can be achieved with productive support equipment available for document automation. Writers find that use of modern word processing equipment in the office offers the best solution to improving their efficiency during the generation phase of the document. They are finding, however, that a productivity limit will be reached unless writers prepare a support matrix to guide them through the document preparation phase. The decisions associated with the development and use of a support matrix are the subject of this paper. One matrix will probably not help all writers, because writers with different companies perform product document tasks for different purposes and with different complexities. At best the following discussion serves as an example for implementing a support matrix and points out the advantages that can be realized. Writers working with word processing equipment are challenged to apply their own discipline to the test.

ABOUT THE WRITING PROCESS

The writing process is analogous to the process for separating metal from ore. Writers review tons of reference material to begin understanding the concept or product which they are about to document. They dig out the useful, high-grade information that fits into molds for their document - labeling each mold with the type of information destined for the users' needs. A blast of heat is applied to the information, and the moltened facts are yielded. The hard work, however, is just ahead. The writer takes each ingot of information and polishes the bare facts to meet the standards of acceptability. For instance, the ingot on installation instructions may need a step-by-step procedure in its format, while the ingot on functional description calls for a tutorial style. Each polishing may be seen from different perspectives by the reviewers. The writers give their seal of approval when the information ingots are stacked together in a perfect balance, ready to go to the customer for weighing the pure truth and its worth.

WORD PROCESSING

The above analogy demonstrates that writers perform the documentation duties of generating, condensing, and rewriting to achieve a degree of perfection in their work. They organize their efforts in three classic phases - research (studying), writing (creating), and document final preparation (publishing). Because each phase is a required step in the sequence, it must occur in the above order for each task of generating a document. Improvements in efficient document processing must (1) touch on each phase and (2) aid in the transition between phases, both important aspects of automating the documentation process. It also should be noted that each successive step is done with the next step in mind and ready for implementation.

Word processors help by allowing the writer to capture data and merge pages, sections, and paragraphs of new and repeated information, while giving a degree of flexibility for future document content adjustments and, at the same time, aiding in the steps of document generation.

RESEARCH, PHASE I

The research phase of document generation can include tabulation and storage of data in the word processor. The archive formed can be at minimum an outline of major topics which expands as more information is learned about the product. The framework should be built around existing standards in the organization for documentation. Some sources define expansions beyond the basic outline as a basis for a book plan. Plans of this type require the addition of topic paragraph descriptions, as well as descriptions of figures and tables intended for the document. The framework for tabulated data should be standard for similar documents in a series. Word processors are effective in providing reuseable standard forms for data input during research.

WRITING THE DOCUMENT, PHASE II

The tabulated information in the archive will serve as the new information source for writing the document draft. A hard copy can be printed on the word processor printer. The copy will be the exact information from the archive file and can be used for making special notes and comments in an effort to collect last-minute details. Writing to the outline requirements can be followed without severe restrictions. For example, the writer will want to write the functional description around the functional diagram(s) of the product, and can feel free to expand or contract the subject material to fit the description needed. Each functional block of operation can have an associated paragraph of text with the same heading. When the text is drafted on some word processors, the paragraph headings can be listed automatically in index form to help the writer determine if all the functional blocks have been covered.

DOCUMENT PREPARATION, PHASE III

The writers, once finished with the document draft, are eager to have the document edited, reviewed, and published as soon as possible. In parallel with these efforts, they would like photographs and illustrations to be processed for final preparation. Word processors can help accomplish these requirements much faster.

A word processor is a must for the editor, because suggested rework or corrections can be made with comments directly on the display screen and recorded in the document file. The reviewers from another department also would benefit from word processing access for the same reasons. Without a word processing unit, hard copies of the document would have to be circulated. Each reviewer would have to make comments in pencil and carry the copy to the next reviewer, thus slowing the process.

Engineering writers generally want their documents prepared to a published standard or guideline which requires a certain style and format to be followed. Within these standards are the defined layout, such as single or double column, image area dimensions, type of font and size, right and left margins, and justification. Documents prepared to these standards on a word processor require entry of these parameters only once. On command, the word processor automatically makes the conversion to the defined standard.

If final preparation requires conversion to a typesetter (strike-on or photo), the writer need not participate in the actual input of these directions to the automated composer equipment. However, the writer will have to make the final document requirements known to the composer operator, so they can be entered as the standard for document playout. The writer, working with the editor and composer operator early in the task definition phase, can be assured that the document is prepared to the desired publication standard.

Converting the writers' keyboard-entered document to the final typeset publication, at best, will take much planning. The word processor used should be programmed by menu to allow discrete formats for writers' input of text, tables, and listings. For example, if the final playout of the document is going to be 20-pica column widths with 10-point type, then the word processor should be programmed (format menu) for 3 and 5/16-inch column widths using a 15-pitch printout typeface. With this method used the composer can convert the output document to the desired format with the least number of adjustments. Also the printer output for the review copy will appear similar to the composer final.

Writers can easily enter into the word processor tables and lists which have simple columns. However, tables having columns with shifting centers should be left for direct entry on the composer. The reason is that the composer will require different tab positions than those used on the word processor when the final type and size are specified.

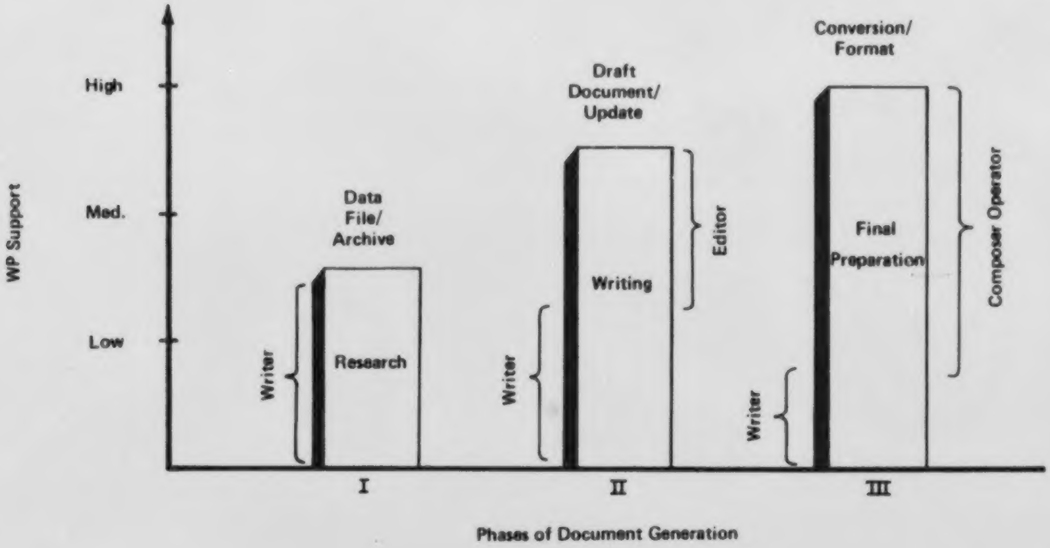
A number of other format considerations also must be understood when dealing with the word processor and composer interface (margins, indent, etc.). These factors should be identified and established early to allow inputs to be converted to outputs with little additional effort.

SUPPORT MATRIX

Writers must explore a number of approaches to make full use of word processing equipment efficiently and productively. A matrix of support tasks and milestones is an important part of planning the successful use of word processing equipment. Some of these tasks are presented below and are keyed to procedural steps that writers experience in generating a document.

	Writing Tasks	Tasks on Word Processor
1.	Writers keyboard-enter their document outline and special notes about the product.	The archive is generated, standards are set, and the file is labeled.
2.	Writers expand each section and paragraph as the information becomes available from the research of data.	The document text file is expanded or contracted to accept the input of information.
3.	Tabular data or listings are generated in a matrix form as the writers find their use appropriate.	The document table format is sized to accommodate the information.
4.	Writers develop document contents to 2nd- and 3rd-order headings for information tier levels.	The document file is expanded with detailed paragraph numbers and headings to identify sub-levels of information.
5.	Writers insert references in text for figures and tables, as well as give short descriptions of each, as a key to their importance.	The figure and table files are created with reference to the size, location, and title of each in the document.

(Cont'd)



Word Processors Find Applications in all Phases of Document Generation

	Writing Tasks	Tasks on Word Processor
6.	As the text is expanded by sections, the writers enter percent completion notes to flag the amount of additional effort required (%).	Percent figures can be marked for removal when the document file is completed.
7.	The writers request a printout of the document file to allow review by the other technical reviewers.	The word processor is programmed to output the document file on the printer in the format standards given in the menu. Double space is specified for ease of review.

CONCLUSION

What has been presented here are practical considerations which writers can use in learning to use the word processor as more than a typing machine. Depending on which brand of word processor is used, the writer will find that the software can be anything from inadequate to highly supportive. Writers must verify that their equipment gives them the support they need to generate documents. Adequate support means starting with an accessible file for initial record keeping, and finishing with a document file that is easily converted for document output and typesetting.

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HUMAN FACTORS IN AUTOMATED DOCUMENT PREPARATION

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Automating document preparation affects the tasks of author, editor, and secretary. When lines between functions blur, separations of responsibility between staff levels change. Authors who use electronic tools spend less time to proofread and edit document drafts; their work shows more polish and exactness, because small changes accumulate to yield better-quality writing. Secretaries' tasks change enormously as document-production is automated; they are asked to devise effective electronic filing systems, cope with alien systems, and manage powerful formatting capabilities. Unless managers consider carefully how automation affects secretaries' work, support staff can succumb to the "button-pusher" syndrome. By definition, good editing is transparent; because electronic editing is mostly invisible, editors assume more responsibility for not changing authors' meanings. Successfully automating document preparation involves (1) describing explicitly how automation affects various staff members' tasks, (2) exploring human factors associated with that automation, and (3) identifying related management and control issues.

The traditional flow of document preparation was essentially a "batch" process in which author, secretary, and editor worked serially on a piece of text. Now, electronic tools have put that batch process "on-line;" as soon as text enters the automated process, any member of the documentation team can call it up and work on it. As a result, traditional functions are splitting apart and recombining differently. The dividing lines between steps have blurred, some of the functions now overlap, and more iterations take place within steps. Document preparation takes time, resources, and planning. Inept document production can destroy any project's schedule, and a botched process can destroy working relationships between team members. This paper explores some changes that occur in human actions and reactions when document preparation is automated.

CHANGES TO FUNCTIONS AND INTERACTIONS

Using automated tools like word processors and microcomputers can interject machines at any stage of the document-preparation process; automating one part of the process affects both that part and all others that touch it. Just as the lines between functions blur, so do the separations of responsibility between various staff levels. Authors', secretaries', and editors' tasks are interrelated, so any look at the costs and benefits attached to one necessarily includes the others.

Changes to Authors' Tasks

Authors who draft by hand know that writing out text takes considerable time; short deadlines can turn flowing script into hen scratches. Other times, document production may slow to a snail's pace while frustrated typists try to cope with unfamiliar dictation. The clear solution is automated text entry, but what are the human dimensions of such a wholesale change in peoples' work habits? Some authors dive in with two fingers and enthusiasm; others bring out rusty skills or gingerly begin to learn. Some authors—the lucky ones—transfer from typewriter to computer with glee, because even the most rudimentary word processing program is many times faster and easier than any typewriter.

When authors use machines to create inital text, writing time may lengthen until they develop good keyboard skills. However, after initial text entry, these authors spend far less time to proofread, edit, and make changes to subsequent drafts. In the new, shorter process, authors or editors assume responsibility for making changes correctly. The authors' old, laborious process—marking corrections on print copy, having the corrections entered by someone else, and then checking to see that all changes were made accurately—yields to, at most, a two-step process of entering corrections and proofreading the results. Clearly, the key-entry task can no longer economically be considered "low status"—ten fingers on a keyboard becomes a sign that an organization seeks maximum use of its peoples' capabilities.

The author who types well and/or becomes proficient with a text editing program usually expects different services from support staff: printer supervision ("Bring me the print-out, please."), formatting ("Please put out this text file as a standard memo."), and inter-system transfers ("I sent a chapter from my micro to the central computer; please bring it over into our word processor.") Some authors have workstations linked in networks with support staff. Others draft material on "alien" systems—personal computers, etc.—and transmit text directly. Many authors simply enter words as quickly and painlessly as possible and expect other people to handle formatting. Other authors—often those who routinely switch formats to match circumstances—play with translation tables and search/replace capabilities in order to automate the transmission completely. For example, these authors learn that some mainframes put in carriage returns automatically at the end of each line; to translate automatically from these mainframes to micros, then, calls for a word-processing system or program that can search for and replace unwanted carriage returns.

Outlining is indispensable to automated document preparation; the small-screen view of documents tends to be fragmented and unruly. In any document longer than a page or a screen, unattached and unidentified text can float away into the never-never of "I know I said something about that topic; now, where did I put it?" Replicated paragraphs can appear seemingly at random. Some text-editing programs give little information about current location in the text; authors learn that keying sections or paragraphs to outlines saves time and creates "road maps." Particularly when moving and copying text, authors learn—sometimes expensively—to keep careful track of what goes where. Fortunately, creating and modifying an outline takes less effort (but not less thought) when the results are quickly available at a terminal.

Changes to Secretaries' Tasks

As authors use more automated equipment, secretaries' tasks change radically. For instance, an author who keys text into a remote microcomputer less often needs a secretary who transcribes dictation, but more often needs one who transfers text to and from "alien" systems. This task may be simple; follow exactly a set of prescribed steps that hooks one system to another and transmits text. More often, considerable reformatting may be required because—for example—system X only accepts 80-character lines, system Y has no automatic way to get rid of extra carriage returns, and system Z texts are coded with double percent signs (%%) to indicate hanging indentations. Even experienced secretaries will need significant amounts of formal or informal re-training to tackle these new tasks.

Within offices, secretaries who manage many automated formatting capabilities can reduce authors' needs to view and mark draft copies. Often, they have considerable freedom to explore new systems and match powerful formatting options to authors' requirements. Support-staff members are responsible for more local printing and photocopying; they use high-speed line printers for drafts and letter-quality character printers for final copy. Secretaries are also challenged to handle communication outside their own offices, connecting with networks, data bases, remote terminals, and personal computers.

During all of these changes to authors' and secretaries' tasks, people feel alternately exhilarated and threatened. Wise managers strive to avoid the "button-pusher syndrome," in which professionals do all of the creative work and support-staff members only push buttons to activate machinery. Managers have several options. For example, secretaries can create document maps that track all of a project's paperwork; copying the header lines from all documents into an index document shows where each set of information resides. They can use lists of search criteria to assemble reference packets that lift material from dozens of documents or data bases; for instance, searching for a particular acronym or keyword can indicate what companies or working groups are interested in a given subject. One author needed to locate the first reference to a company's long-term plan and then to track subsequent references through a series of documents; what heretofore would have been a laborious chore became a few minutes' work at a terminal. Professionals have insufficient time to manage all of these new capabilities, and secretaries need the job-enrichment which that managing will supply.

Changes to Editors' Tasks

Editors' work is, by definition, supposed to be "transparent"—that is, it should be in no way discernible to readers who want to know what authors say. In the same way, authors view good editing as a mechanism that tightens, clarifies, smoothes, and otherwise improves their work. This requirement hasn't changed. What is changing is the amount of editors' work invisible even to authors and the amount of responsibility editors therefore take for final content.

Editor/author relations vary widely with personal styles. Technical authors who speak two sentences of computer or mathematics for every one of English often seem relieved when editors "translate" successfully. Authors who discuss economics or social science in flowing periods may have to be led to realize that simple sentences and semi-colons can vastly improve their texts' readibility.

In light of these variations, many questions arise: how much changing can editors do and still have authors "own" the text? How much of the editing process must authors see, feel, and touch? Even when authors work with familiar editors, both need ground rules for editorial revisions. Making changes electronically so authors only see clean, unmarked work has both negative and positive effects. On the one hand, tender-egoed authors don't have to cope with the psychic shock of seeing pages covered with editors' marks. On the other hand, authors who mistrust their editors' commitments not to change meanings must struggle to pinpoint particular changes.

Also, the distinctions blur between editing authors' existing work and writing new text. Changes in meaning become more abhorrent as they become more difficult to detect. Smart editors make it immutable practice to work electronically only on copies of documents; otherwise, fine shades of authors' meaning can be lost without a trace, except those authors' uneasiness or active displeasure. Editors also present for review both the old text and the new. Authors are seldom comfortable with less than professional editorial service in which no change occurs capriciously. Because the process is automated, editors assume more responsibility for a negative—for not changing authors' meanings.

Sometimes authors and editors collaborate at an early writing stage; both contribute words, with one or the other acting as scribe at a terminal. The process combines editing and dictation: for example, the author says, "The installation of an applications packet . . ." and the editor writes, "Installing an applications packet . . ." The editor says, "What noun does this 'floating this' refer to?" and the author supplies the appropriate specific.

Multi-Level Changes

Mr. Rogers' explanation that "all of you grows together, because you're all in one piece" doesn't necessarily apply to automated document production. Some authors will still prefer dictation, some editors want printed copy and soft pencils, and some secretaries prefer to do tables on a typewriter. These idiosyncracies notwithstanding, certain benefits become available across-the-board as soon as even part of the document-production process is automated.

At all stages, documentation-team members can make small changes easily—changes heretofore discarded because they were "too small" to merit re-typing the whole document. Without exception, the resulting documents show more polish, exactness, and sheer correctness. Automated production improves the quality of finished documents, because no new errors occur unless someone makes changes; once copy is clean, it stays clean.

In electronic editing, authors, editors, and secretaries get comfortable with tagged notes, references, and queries. Authors say, "** text from 10/20 memo" or "** fix transition." Editors say, "** strong statement—do you want to qualify it?" or "** global search/replace: reenter/re-enter." Secretaries say, "** page-break bad; where should bullets divide?" or "** transmission garble—best guess..." Each person records and tags information for others to deal with in their own time frames. No one's memory is critical, because questions are set down; a final automated search through the text for tags eliminates the last stray question that someone "was going to deal with later." All these queries invite human interaction that otherwise disappears or disturbs the flow of each individual's work.

MANAGEMENT AND CONTROL ISSUES

In addition to avoiding the "button-pusher syndrome" described above, managers of automated document production face significant changes in their responsibilities.

Whenever any sizeable part of an office's document preparation is automated, someone had better devise an effective electronic filing system so that users can store and retrieve documents painlessly. Secretaries must use systems' document summaries and indices creatively, packing maximum amounts of information into limited spaces. If, for example, a system can index entries only by one or two short data items like "author" and "operator," wasted space in those descriptions is intolerable.

Managers establish conventions for determining and abbreviating key document references that everyone must use. They also set rules for identifying and dating versions. Without good electronic filing, personnel and assignment changes may cause documents to vanish from view and to reappear only with considerable time, effort, and frustration.

Besides being responsible for document retrieval, managers make decisions about maintaining document integrity and improving production. They deal with very human problems: who is "allowed" to change a document at will, who must have "permission," and who has "control." One solution for this problem involves a two-tiered system of file access. In Tier 1 are secretarial-staff "file" copies of documents in forms suitable to go outside the immediate office. Secretaries control these files; professional staff keep "hands off." Tier 2 contains a personal file for each person in the office—both professional and secretarial. Absolutely no formal rules govern these files; users may enter, retrieve, and/or print notes, data, text, lists, or any other material they choose. In practice, professionals copy material from Tier-1 files into Tier-2 files and change it at will; secretaries copy altered material back from Tier 2 into the "file" tier. Material from personal computers goes into Tier-2 files and then, with suitable labeling (and formatting, if necessary), into Tier-1 files.

Managers also decide how to balance the tradeoff between doing more versions of a document to improve quality and spending less time to achieve the previous quality. The level of accuracy and neatness that once took days now takes minutes or hours.

SUMMARY

Automating any part of the document-preparation process affects the functions of authors, secretaries, and editors. More importantly, automation affects the ways people do their jobs and the ways they interact with one another. Recognizing explicitly how automation changes people/job relations is crucial, because fine equipment and fast tools work only as well as their users.

In contrast to the linear "batch" process, the new on-line process can be visualized as an interactive triangle of author (who creates documents by initiating efficient, legible information), secretary (who manages and operates computer programs to deal with files, formats, inter-site transmissions, and security procedures), and editor (who feeds back queries and alternate formulations, while dealing with syntax and grammar and making expression idiomatic).

Computers and Technical Communication: From Planning to Publishing

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In ever-increasing numbers, technical writing and communication groups find that they can use computers to make their jobs easier and at the same time provide higher quality information to their readers. We propose a panel of speakers, a workshop, and a set of videotaped presentations to acquaint ITCC attendees with ways that computers can be used in a communications group to smooth and improve the flow of information.

This poster summarizes the information in Panel ATA 6A: "Computers and Communication: From Planning to Publishing" and Workshop ATA 8B: "Automating the Writing Process: A Case Study." It shows ways that computers can be integrated into the communication process as a tool to serve communicators--not as a dominating force that creates unnecessary work for them, or places additional burdens on them.

Ready access to computers has become a fact of life for many communicators, and the extent to which they are willing or able to use these computers will, in large part, determine their effectiveness as communicators in today's high-technology environment.

While the computer is in fact made a part of an existing communication process, at the same time it helps to reshape that process, adding new scope and capability to the communicator and providing means of communication only dreamed of a generation ago.

To make best use of an online computer system, a communication organization must structure its files and grant access to these files in such a way that everyone in the organization has access to needed information. At the same time, care must be taken to ensure that unauthorized persons do not have access to sensitive information nor the ability to modify or inadvertently destroy others' files.

This poster traces a technical communication department's use of a computer system throughout an entire information-development cycle.

Stop by and have a look!

Using Computers to Manage the Information Development Process

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Writing groups can use an online computer system to control the development of technical manuals. Writers, planners, and managers will find it useful to keep track of the information development process.

This paper describes the kind of information that can be put online, tells how to update the information, and gives the advantages of using the computer to track the information development process.

Using Computers to Manage the Information Development Process

This paper describes how writing groups can use a computer to help keep track of the manuals that they write. Status information is stored online, and it can then be accessed at a display terminal, or a paper copy can be printed. In this paper the status information is called a tracking report.

First, this paper gives an example of the data that can be put online.

Next, it shows how to update the tracking report to keep it current.

Finally, it gives that the advantages of using a computer system to track manuals.

Who Uses the Tracking Report

All those involved in the information development process will find the tracking report useful.

Writers can use the tracking report to keep track of their own books and to report their status to management. In addition, they can compare the status of their books to the status of other books.

Managers and planners can use the report to control the progress of each of the manuals. They may also find the report useful to tell higher management and other groups of their progress.
The reviewers of a manual and those who do the final production of a manual will also find the report helpful.

An Example of a Tracking Report

The example shown in Figure 1 is a simplified example of a tracking report for a library of manuals that describe a computer system. Figure 1 shows three of the manuals in the library; a real tracking report would show all of the items.

The blocked numbers at the top of Figure 1 match the number of the explanation of each item, given below.

1 Title	2 Order No.	3 Outline	3 1st Draft	3 2nd Draft	3 Edit	3 Avail	4 Pages	5 Writer
Commands	Edition 3	none	none	6/30/83	7/30/83	9/30/83	650	Smith
	Edition 2	none	none	6/30/82	7/30/82	9/30/82	600	Smith
	Edition 1	1/30/81	4/30/81	6/30/81	7/30/81	9/30/81	500	Smith
Messages	Edition 3	none	none	4/30/83	7/30/83	9/30/83	900	Brown
	Edition 2	none	4/30/82	6/30/82	7/30/82	9/30/82	850	Brown
	Edition 1	1/30/81	4/30/81	6/30/81	7/30/81	9/30/81	800	Jones
Setup	Edition 4	none	none	4/30/83	7/30/83	9/30/83	60	Jones
	Edition 3	none	none	6/30/82	7/30/82	9/30/82	56	Jones
	Edition 2	none	10/30/81	11/30/81	1/03/82	2/30/82	56	Brown
	Edition 1	1/30/81	4/30/81	6/30/81	7/30/81	9/30/81	55	Brown

1 Title. The tracking report contains an abbreviated title for each manual. The title stands out by itself on the left, so you can easily scan down the report and pick out the title. Easy visibility is important when a tracking report has a large number of manuals.

2 Order Number. The order number is an important book identifier. While the exact title of a manual may change, the order number can be constant for the life of the manual. The order number also shows the latest level of the manual. In the example, the latest level of commands available to customer is Edition 2, which was available on 9/30/82, while Edition 3 is being worked on and is not yet available.

You can see that the Setup manual has had one more edition that the other manuals. Perhaps there were problems with the first edition of the manual, and it had to be replaced sooner than expected. You could add this information to the tracking report to make it more complete.

3 Schedules. The schedules for a manual take up the most space on the tracking report. The schedules show the dates that writer must meet, from the outline stage through passing the manual to an editor. As the heart of the tracking report, the schedules section can have more detail than shown in Figure 1. It can contain dates for review meetings, test dates, dates for shipment to the printer, etc.

4 Pages. This item tells you the size of any manual, and the size of the entire library if you add up all the items. It also shows you the trend in the size of a manual from edition to edition. You could expand this section to show the number of changed pages and new pages in each revision.

5 Writer. This item lets you tell at a glance who was responsible for an edition of a book. If you know who the writer was, you can ask questions about what happened in the past. It's surprisingly easy to forget who did a certain piece of work as years pass, especially if you have a large library of manuals.

Figure 1. An Example of a Tracking Report

How to Update a Tracking Report

There are many ways to keep the tracking report up to date. One way is to send a hard copy of the tracking report to the writers and have them mark changes. A manager or planner can review these changes to see if they are appropriate, and then one person can make the changes to the data set. Figure 2 shows this way of updating the report.

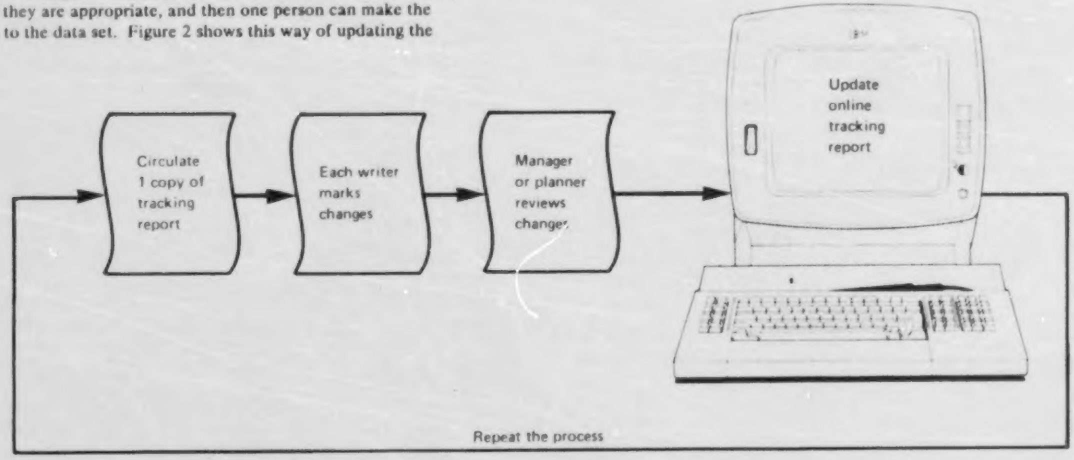
Circulate 1 copy of tracking report
Each writer marks changes
Manager or planner reviews changes
Update online tracking report
Repeat the process

Figure 2. Printed Copy Update

The tracking report could also be updated by making it available online for writers to update, as shown in Figure 3. In some situations this is good way to update the tracking report. It may be, however, that you need more control over the tracking report than this method allows. You may be able to control online update by using your computer system to limit access to the report or by updating an online copy, a copy that is not the final master.

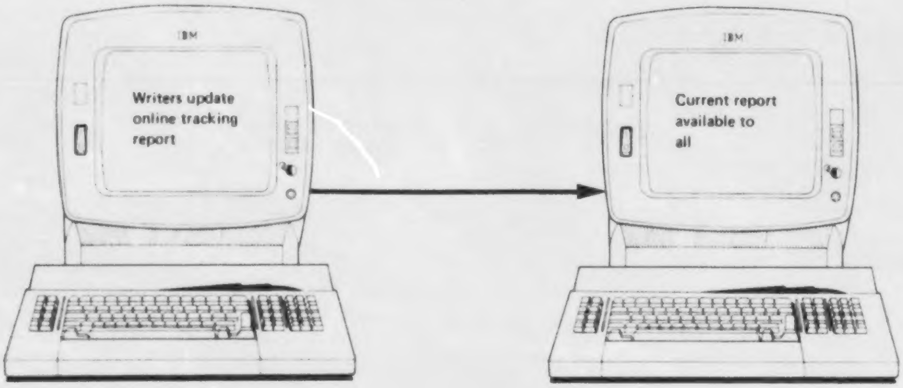
IBM
Writers update online tracking report
IBM
Current report available to all

Figure 3. Online Update

Advantages

The online tracking report has many advantages:

1. It requires little or no programming. You can set up a tracking report if you have some simple formatting and updating capability on a computer. Of course, by using some programs now on the market or by doing some programming yourself, you can improve on the tracking report. For example, you might want an automatic total of certain part of the Pages column. Or you might want to list only the work that is currently in progress, not the entire report.

2. It provides a continuing record over time. You can refer to the report to find out what happened to a manual in the past.

3. Because of the way the report is structured and through the capabilities of the computer, you can add to the tracking report almost indefinitely.

4. The tracking report can be readily available online to cut down on paper handling.

5. You can easily update the tracking report. Schedules for manuals change constantly for all kinds of reasons; a tracking report helps you cope with this.

6. The tracking report is a source for reports to others, both those directly involved in the writing process and to other organizations. It is easy to extract information for a particular audience.

Summary

The information needed to keep track of the development of manuals can be organized into a tracking report. The tracking report makes it easier to control the information development process. All those involved in writing the manuals will find the tracking report useful.

Putting Computers to Work for Us

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Technical writers can use computer tools to do clerical tasks, make libraries more consistent, create simple graphics, proofread and edit copy, and evaluate finished pieces of writing. By developing and using such tools, we improve the overall quality of our products. And, by spending less time on redundant or clerical tasks, we find we have more time to devote to our real task: communicating.

All technical writers face the twin challenges of producing good documentation and doing it on a tight schedule. To meet these challenges we need to use our time as effectively as we can.

At IBM in Kingston, N. Y., several computer tools help writers use their time effectively. Running under the IBM Virtual Machine Facility/370 Conversational Monitor System (VM/CMS), the tools:

- *Give us more time to write well* by eliminating many clerical tasks, like alphabetizing lists for indexes.
- *Make our libraries more consistent*, therefore easier to use, by increasing uniformity and saving writers from duplicate effort.
- *Expand our use of graphics* by making it easier to create things like drawings and lists.
- *Proofread and edit our work* by finding problems or errors, suggesting corrections, and letting us make the corrections from our terminals.
- *Evaluate our work* by giving reading grade levels for the material we write.

Tools That Do Clerical Tasks

These tools use the computer's ability to scan and organize large files of data quickly.

Index: For each index, I make a file that contains all the entries. Then I run the INDEX program, which:

- Alphabetizes the entries in the file
- Adds the control words necessary to format the index in the text-processing language we use in Kingston

Scanfile: Scanfile searches through text to find each instance of a given word or piece of data. This helps me:

- Build an index, because it finds *every* instance of the word. Of course, I don't index each and every offhand reference that Scanfile spots. That's where human judgment, which never can be programmed into a computer, comes in. But Scanfile helps assure that the index is complete, and it gives me more time to do "human" work (like using that judgment).
- Check that my text will be processed correctly. Our text processing language has "begin" and "end" control words for things like lists and highlighted phrases. If Scanfile spots a "begin list" without a corresponding "end list," for example, I have a chance to fix it before I print the text.
- Make changes that can't be handled by a "global change." For example, the day before my final draft is due, an engineer calls me and says, "We just made a change! Now there are *three* doohickies on a whatzis, not two." How can I be sure I make the change everywhere I need to make it? Scanfile can show me every instance of the word "doohickie," and I can identify all the ones I need to change.
- Make a passage easier to read. For example, asking Scanfile to find the text "tion" helps me find nominalized verbs. Once again, it's up to me to fix them; that's something the computer can't do for me.

Show: SHOW does the same job as Scanfile, but it works inside the XEDIT text editor. It shows where each instance of a text string occurs and then lets me move to the record I want to update.

Tools That Make Our Libraries More Consistent

We keep models of different book parts on the system where everyone has access to them. We have models of:

- *Chapter lead-ins*. A good chapter lead-in is a "road map" of the chapter. When a book--or better still, a whole library--has chapter lead-ins that are consistent in format and wording, readers sense unity in the library and feel more comfortable moving around in it.
- *Prefaces*. A preface is a large-scale chapter lead-in: it describes a whole book. Again, consistent prefaces give unity to a library. Figure 1 shows our model preface.
- *Bibliographies*. A bibliography is a large-scale preface: it describes a library.
- *Glossaries*. When words are defined the same way throughout a library, the library looks more unified than when they're not. It *is*

PREFACE

About this Book

This book describes (---purpose---).
With this book you can (---subject---).
This book applies to (---offering, release, system level, service level---) of (---product name---).
The (---product name---) runs under (---operating system, program name---).

Who Should Use This Book

This book is for those who (---audience---).
This book assumes that (---expected level of knowledge---).

How This Book Is Organized

Use the first chapter to learn the (---major topics---).
Use the second chapter to learn the (---major topics---).

Use the last chapter to learn the (---major topics---).

How To Use This Book

Use this book to (---use---).

Related Information

Refer to the bibliography at the back of this book.

Figure 1. The Model Preface

more unified, in fact: writers become more consistent in their use of words when they share a common glossary. Our model glossary contains the latest, approved definitions for all the words that pertain to the IBM products we write about at Kingston.

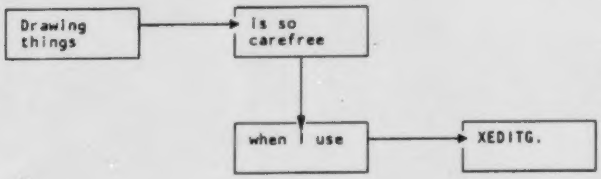
To add a preface to my book, for example, I just copy the model preface into my book and fill in the blanks. To add a glossary, I copy the model glossary and delete the entries that don't apply to my book.

And the time I would've spent creating a preface and a glossary from scratch--and typing them--I can use instead to improve my writing.

Tools That Expand Our Use of Graphics

These tools make it easy for writers to make drawings and lists.

Simple Drawings: The XEDITG tool (for XEDIT Graphics) works inside the XEDIT editor, letting me do simple drawings right at my display terminal. I drew this "flowchart," for instance, with XEDITG:



XEDITG places artwork in the same data base as the rest of my book, and the drawings print successfully on all the printers we use at Kingston.

XEDITG also:

- Gives the artists more time for complex artwork by freeing them from doing simple drawings
- Gives the production staff more time for layout and book design by freeing them from a lot of paste-up artwork
- Encourages writers to include more graphics in their books because it's easy to use

Lists: Lists create active white space on a page and are easier to read than paragraphs. I'm using more lists than I used to because they're easier to create and update.

Our text-processing language makes it easy to use lists. A control word at the beginning of the list identifies the *kind* of list, a control word at the end identifies the *end* of the list, and another control word (repeated as many times as I need it) identifies each *item* in the list.

To add a new item to a list, I just insert it: our text processor renumbers all the succeeding items for me. To change the kind of list--for example, a bulleted list to a numbered list--I just change the control words at the beginning and the end. Our text processor takes care of each list item for me.

Tools That Proofread and Edit Our Work

The PROFS (short for PRofessional OFfice System) Proofreading Facility does simple editing right on a display terminal. The Proofreading Facility looks like a full-screen text editor, and it can identify:

- Misspellings, typographical errors, and bad capitalization
- Words taken out of context (it marks homonyms)
- Words inappropriate for the grade level for which I'm writing
- Awkward phrases

When the Proofreading Facility spots a problem, it suggests ways to correct it and lets me do so just by pressing a key. It's a good guesser too: though it usually offers several alternatives, the first one in the list is often the one I want. For example:

When I misspelled this:	The PROFS Proofreading Facility suggested these alternatives:
sugest	suggest sagest surest subset sunset surges
improtant	important
comptuer	computer computers commuter computed computes
commadn	command commands commando commanded commander commandos
comand	command commands commando commend company cowhand

The PROFS Proofreading Facility knows it isn't perfect, too. Suppose I *wanted* the word "comand." (Maybe it's somebody's last name.) With a single keystroke I can add the new word to an "addenda" list, and the Proofreading Facility will recognize it as a valid word from now on.

With the Proofreading Facility, I don't have to be a spelling whiz, and that's good. I'd rather spend my time polishing my writing, and my editor would rather spend his time looking at things like the book's organization and how well it complements the rest of the library.

Tools that Evaluate Our Work

The Newfog tool (named, I guess, after Robert Gunning's famous Fog Index) gives statistics on:

- The size of my document
- The length of my sentences
- The number of big words I use
- The number of acronyms and numbers (which tend to decrease readability) I use
- The Fog, Fry, and Flesch indices

For example:

```
      NUMBER OF RECORDS READ =   338
           NUMBER OF LETTERS =  6895
         NUMBER OF SENTENCES =   142
             NUMBER OF WORDS =  1439
  NUMBER OF WORDS / SENTENCE =    10.1
     NUMBER OF POLYSYLLABLES =   126
          NUMBER OF ACRONYMS =    28
           NUMBER OF NUMBERS =    10
--------------------------------------
                   FOG INDEX =     7.6  FOR FILE 'MYBOOK   SCRIPT    *
           FRY X COORDINATE  =     9.9
           FRY Y COORDINATE  =   159.7
                FLESCH       =    61.3
```

Newfog's statistics shouldn't be used for comparing one book with another--or one library with another--because they're imperfect. A computer program, for example, will mark "important" as harder to read than its synonym "key," even though "key" is at a higher grade level.

Newfog *is* helpful for spotting potential problems in books while there's still time to fix them. Usually I run Newfog, fix the problems with the PROFS Proofreading Facility, and run Newfog again to measure my improvement. And when Newfog's numbers are nice, that's a good feeling.

Tools for the Future

Certainly the tools in use at IBM Kingston don't exhaust the capacities of today's powerful and versatile systems. Computers can help us--the technical writing community--meet our challenges now, more than ever, because:

- We do more and more of our work on word-processing systems.
- We must produce *more* material in a shorter *time*--and have to do it *better* because we're writing for increasingly less sophisticated audiences--than ever before.

We can put computers to work for us by:

- Understanding and exploiting their abilities
- Communicating techniques to each other, as we discover them, via:
  - Forums like the ITCC
  - *Technical Communication* and other journals
  - Newsletters circulated within organizations

Computers themselves are challenging us. We can use them to solve many of the problems we grapple with every day, if we can identify the problems and if we're willing to work a little for the solutions. We're all proud of our creativity: let's use it to put computers to work for us.

Publishing Information with the Aid of Computers

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This paper describes how information that was planned and developed with the aid of computers flows easily into the publishing process. It describes how a professional information developer, an editor, a publishing specialist, and the computer can work together to take a document from manuscript to reproduction masters with speed, efficiency, and relatively little physical effort.

The presentation describes how an information developer and an editor can expedite the editing and review processes by distributing documents through a computer network. It also describes how various software tools give the information developer and the editor a great deal of flexibility in designing the physical document to take into account the audience, the cost, and the environment in which the document will be used.

The presentation goes on to describe how publishing specialists can set documents in type, and merge detailed graphics with typeset documents to create reproduction masters with little or no manual paste-up.

Publishing Information with the Aid of Computers

By now, many if not most technical writers have given up their typewriters for a word processor of some sort. Many of the reasons are obvious. With a word processor it is far easier for us to revise a document, to add, delete, or rearrange material. Word processors can correct our spelling and even analyze a document and tell us when our writing style or vocabulary is too complex to be readily understood. Most important to many of us, a word processor makes it relatively effortless to produce a *clean manuscript* for review or submission to a publisher.

Is There Life After Manuscript?

Unfortunately, the job of many word processors ends with the output of the manuscript on a letter-quality printer, the equivalent of an electronic typewriter. Let's take a look at some of the things that usually happen to a manuscript after this point and how a comprehensive text processing system could make these steps easier and less costly.

1. Often, copies of the manuscript go to various individuals for technical review. In most cases, this involves making enough copies for all the reviewers and mailing the copies to them.
2. An editor edits the manuscript, making corrections and comments on style, grammar, and organization.
3. One or more production specialists (1) prepare the final reproduction masters for printing. This step may include phototypesetting, preparing artwork, and "paste-up" operations such as mounting artwork or laying out galley text.

Reviewing the Document

How could a comprehensive text processing system help us get our document out for review faster? For starters, the computer can provide a fast and inexpensive distribution medium. Many companies today have computer networks that connect users in a number of locations. Even where there is no computer network, such as cases where independent authors are dealing with independent reviewers, most word processing systems have data communication features that let them "converse" over telephone lines. We can get a copy of a document to a reviewer in a matter of seconds over a communication line that might take days to get there by mail.

What does the reviewer do then? If the authors and reviewers have compatible word processing systems, then they are in luck. The reviewers can display or print the document, review it, and return their comments to the author. But finding completely compatible word processors throughout a single company can be rare, let alone when independent authors, reviewers, and publishing houses are involved. The comprehensive text processing system solves this problem by using a generalized markup language--GML (2).

Most word processors use unique "codes" within a document to indicate to the word processor the page dimensions, margin widths, line spacing, and other text formatting considerations. These codes are unique to individual word processors, and are generally not compatible from one word processor to another. A generalized markup language, however, identifies structural elements within the documents — such as heads, paragraphs, lists, items within lists, and figures — not explicit formatting actions. Any word processor can then interpret the GML and format each element in the appropriate manner, considering the output device (printer or cathode ray tube (CRT) display) available to it. Therefore, an author who developed a document on a particular word processor with one kind of printer can transmit it to a reviewer across the country with another kind of word processor and printer. Each individual's word processor interprets the GML in its own way, and they can each print the document on their own system. This generalized markup language is one of the most important parts of a comprehensive text processing system.

Editing the Document

The communication between an author and an editor can be much like the communication between an author and a technical reviewer. One exception is that in many companies, the author and the editor work in the same organization, perhaps even in the same department. If this is the case, they probably use compatible word processors, but the use of GML is just as important here as it was when the document had to travel between systems. Because the GML identifies structural elements of the document rather than explicit formatting, the editor can affect the overall design of the document simply by adjusting certain parameters of the program that interprets the GML. For example, the editor could change the number of columns, the typography of the body text and various head levels, line length, justification, or the numbering style for figures, pages, and tables, without changing the document itself.

Since the GML identifies document elements and formats them in the appropriate manner for a variety of output devices, the editor can obtain proof copies from several devices and weigh the suitability of cost-effective alternatives to phototypesetting, such as laser or ink-jet printers, for the reproduction masters.

The comprehensive text processing system is not only a word processor, but also provides the editor with valuable analytical tools that

- Identify misspelled words and suggest corrections
- Identify words that may be above the vocabulary of a particular reading grade level
- Identify words that may be used out of context
- Identify awkward sentence construction
- Analyze reading difficulty using average sentence length, frequency of multi-syllable words, and formulas such as those developed by Flesch (4) and Gunning (4)

Producing the Document

As the printing industry moved away from hot metal letterpress printing to phototypesetting and offset lithography, typesetting was one of the first aspects of developing and producing a document to become "computerized." However, the typography and formatting for a phototypesetter require much more complicated and explicit instructions than most word processor formatting, and the programs that format documents for a phototypesetter require the use of a great many complex codes within a document (5).

Most word processing programs are oriented toward producing typewriter-like output. Therefore documents prepared with most word processors require a relatively costly conversion process to make them suitable for phototypesetting. This is where GML comes through once again. Just as the author's word processor interpreted the GML to format the document for a typewriter-like printer, the production specialist's word processor interprets the GML in terms of complex phototypesetter instructions. No changes to the document itself are required. There is no costly conversion process, and production time involved to get from typed manuscript to phototypeset reproduction masters is relatively short.

The Team Concept

Too many times the writing, editing, and production of a document is viewed as an assembly line. When one person finishes a step the next one takes over and performs another. Each individual along the line has a slightly different goal in mind. The writer's goal is a "typed manuscript" that is well-written and technically correct. The editor's goal is a version of the manuscript that is grammatically and stylistically correct, clear, concise, well-organized, and suited to the needs of the audience, and contains typography and formatting instructions for the production specialist. The production specialist's goal is reproduction masters that meet the editor's specifications. Each individual has a slightly different immediate goal. Each individual uses the document for a slightly different purpose. There are few built-in guarantees that the output of one step in the process is the optimum input to the next. Each individual often wastes time undoing some things that were done during the previous step to make the document acceptable for their particular step.

Each individual in this process brings a particular expertise to the process. The writer brings writing expertise and the closest familiarity with the subject matter. The editor brings editorial expertise and an overall view of a related set of documents and the house publishing style. The production specialist brings knowledge of the formatting aspects of the GML, the use of graphics programs to create artwork, and merging the text and art together to obtain the final objective of the whole process — reproduction masters for the document. By working together as a team, they each add their expertise to the document throughout its development cycle. Because the GML insures that a document suitable for output on a word processing printer is no less suitable for phototypesetting, the common end product, to which each individual contributes, can go through the production process in a very short time. To meet this objective, the comprehensive text processing system allows several individuals to "share" a document. The system maintains a document library, where individuals may "sign-out" a document to work on their particular aspect of it, then return it for another member of the team to use. This does not mean, however, that such a system is a cure for all production problems. It requires communication and cooperation between all the members of the team. It requires the development of a teamwork attitude as opposed to an assembly-line attitude. In such an environment, a comprehensive text processing system is a powerful tool that can shorten a document's production cycle and ultimately lower the cost of producing it.

Summary

The comprehensive text processing system allows the development of a document in such a way that

- The technical writer can easily update, revise, and produce draft copies of it
- The technical reviewer can quickly and efficiently obtain a copy of the document for review
- The editor can, usually at any time, obtain a copy of the document to edit
- The production specialist can quickly and efficiently produce reproduction masters for the document, formatted according to the house style, with artwork in place

By working together as a team, each individual contributes to the document and very little effort is wasted reworking the output of the previous step. By sharing the document, one person's work on it need not be entirely finished before the next person can begin, thereby shortening the overall process. The document progresses smoothly and efficiently from the planning stage through the writing and production cycles.

References

1. Production specialist is used here as a generic term for individuals with a wide range of production-related job skills. At a minimum, this category includes text processing specialists, artists, and layout and design specialists.
2. The concept of generalized markup language was discussed in the paper "Playing Tag with Text Processing," by William B. Adams, IBM Corp., Tucson, Arizona, ITCC 28, May, 1981.
3. Rudolph Flesch, *The Art of Readable Writing*, New York: Collier Books, 1948, 1962.
4. Robert Gunning, *The Technique of Clear Writing*, New York: McGraw-Hill, 1952.
5. IBM's TERMTEXT/Format, Program Number 5796-PBR, is an example of one such program.

THE AGONIES OF A LONG-DISTANCE WRITER: EFFECTIVE MANAGEMENT OF LARGE DOCUMENTATION PROJECTS

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Over the past several years, the computer industry has experienced unprecedented growth. Computers have ceased to be the objects of mystery, and are even being embraced by laymen of all ages as something equivalent to a godsend. Computers are no longer perceived as inhuman chunks of metal that failed to record last month's utility payment, but as the latest status symbols which also happen to perform such miracles as holding a child's interest for an entire evening or reeling off the latest stock market quotations.

As the industry continues to make computers more palatable to a wide range of users, technical writers are faced with three major challenges: developing documentation that will satisfy the needs of all users, packaging the documentation to attract the increasingly discerning eye of the prospective purchaser, and effectively coordinating the myriad aspects of production necessary for large documentation projects. This paper examines these topics in relation to the development of a microcomputer product: the APL*PLUS(TM)/80 System.

BACKGROUND

STSC, Inc. was organized in 1969 to provide an improved time sharing service based on the APL programming language. Since 1969, STSC has been committed to an intensive research and development effort to enhance and extend APL. The result is a generalized application development system called the APL*PLUS System. One of STSC's systems is the APL*PLUS/80 Application Development System, an extended APL language processor for the Radio Shack(R) TRS-80(R) Model III microcomputer.

In December 1981, after six months of development by our Small Computer Products Development Department, the Publications Department joined the APL*PLUS/80 project team. The documentation effort spanned five months and involved three programmer/analysts, four technical writer/editors, three production assistants, and over a dozen reviewers. The final system package, which went to press in May 1982, included a hardware chip, a software disk, and 12 separate documents -- a total of 799 pages of documentation and supporting materials.

The sheer volume of documentation dictated the importance of organization; communication; commitment; agreement on target market, audience, and packaging; and both detailed and overview schedules.

Following are the procedures we used in developing the APL*PLUS/80 documentation package. These procedures can be modified and used for virtually any documentation project.

THE BUCK STOPS...

Producing documentation is like running a marathon -- it begins with one small step and, with adequate preparation before the even begins and consistent performance during the event, need not become increasingly difficult as you approach the finish line.

The first step in developing documentation is to designate a contact person in both the publications group and in the system development group. Their function is to maintain close communication regarding progress, to report relevant information to their respective groups, and to resolve any conflicts that might arise. These individuals must have the authority to make and enforce decisions regarding the project. On the APL*PLUS/80 project, our contact point in development was the product manager (who was also the development team leader). As the senior writer/editor responsible for the complete documentation package, I was the contact point in publications.

SETTING YOUR SIGHTS

The next step is to conduct an initial project planning meeting, inviting representatives from all departments involved in product development, documentation, promotion, and training. In the initial project planning meeting, the group defines overall objectives and required documents for all phases of product release. Due to the space constraints of this paper, I will focus only on the requirements for technical documentation and how to follow them through to completion.

First, realistically define the target market for the product to the satisfaction of all groups represented. Don't be too ambitious. Although it's gratifying to think that your product has unbounded appeal, reality dictates that your efforts should be directed toward a precisely defined group of prospective purchasers.

We defined the target market for the APL*PLUS/80 System as individuals who owned or planned to buy a Radio Shack TRS-80 Model III microcomputer, and who knew or wanted to learn the APL programming language.

GETTING DOWN TO BRASS TACKS

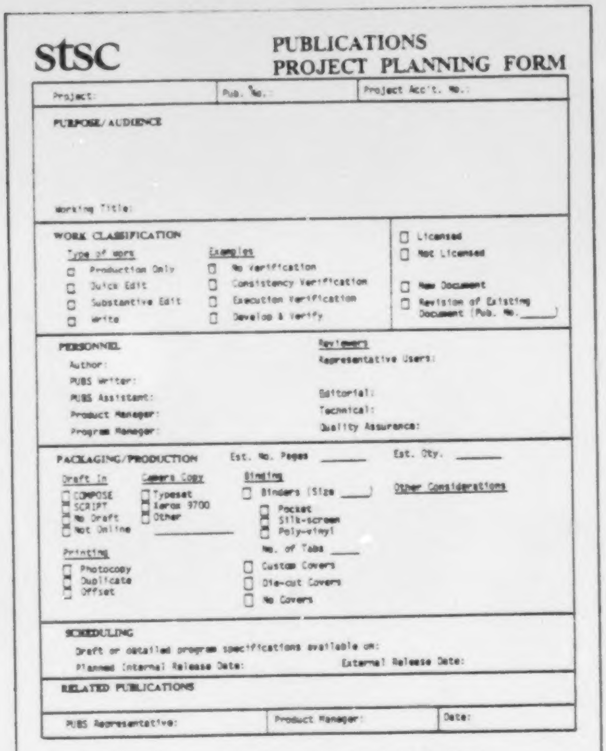
Next, list the major documents and related documents needed to support the software package. This preliminary list begins by defining the functions of the documentation.

For example, the APL*PLUS/80 project required:

- an introduction to the APL*PLUS/80 System and documentation
- a guide to computer operation while using the APL*PLUS/80 System
- an introductory APL language tutorial
- a guide to file structure and manipulation
- a guide to formatting printed reports
- a manual of advanced features for experienced programmers
- two reference cards highlighting system features
- a brochure describing the other systems that STSC provides for portability of applications.

When the list is complete, further define each document for preliminary title, target audience, approximate number of pages, and production and packaging specifications.

The worksheet in Figure 1 provides a convenient, standardized medium for recording this information. Although the form was developed according to standards used at STSC, it can easily be tailored to your organization.



stsc

PUBLICATIONS
PROJECT PLANNING FORM

Project:	Pub. No.:	Project Acc't. No.:

PURPOSE/AUDIENCE

Working Title:

WORK CLASSIFICATION

Type of Work
☐ Production Only
☐ Quick Edit
☐ Substantive Edit
☐ Write

Examples
☐ No Verification
☐ Consistency Verification
☐ Execution Verification
☐ Develop & Verify

☐ Licensed
☐ Not Licensed

☐ New Document
☐ Revision of Existing Document (Pub. No._____)

PERSONNEL
Author:
PUBS Writer:
PUBS Assistant:
Product Manager:
Program Manager:

Reviewers
Representative Users:
Editorial:
Technical:
Quality Assurance:

PACKAGING/PRODUCTION Est. No. Pages ______ Est. Qty. ______

Draft In
☐ COMPOSE
☐ SCRIPT
☐ No Draft
☐ Not Online

Camera Copy
☐ Typeset
☐ Xerox 9700
☐ Other ________

Binding
☐ Binders (Size ____)
☐ Pocket
☐ Silk-screen
☐ Poly-vinyl
No. of Tabs ____
☐ Custom Covers
☐ Die-cut Covers
☐ No Covers

Other Considerations

Printing
☐ Photocopy
☐ Duplicate
☐ Offset

SCHEDULING
Draft or detailed program specifications available on:
Planned Internal Release Date: External Release Date:

RELATED PUBLICATIONS

PUBS Representative:	Product Manager:	Date:

Figure 1. Project Planning Worksheet

HOW'S YOUR AIM?

Now look at how your target market definition compares to your list of documents. Does each document address some portion of the target market? Are the needs of the target market met?

For the APL*PLUS/80, our answers to these questions revealed the need for one other major document -- an intermediate-level APL text to satisfy the needs of purchasers who were not beginning APL programmers, but who were not yet advanced enough to grasp the concepts presented in the Programmer's Reference Manual. Rather than write an intermediate-level text, we included a previously published text that met the criteria we had established.

YOU MEAN THERE'S MORE?

Before concluding the initial project planning meeting, prepare a list of any related materials that will be part of the package. This list includes any items the user will need to operate the system. How will you deliver the system software to the purchaser? For microcomputer applications, flexible disks or cassette tapes containing the system software are commonly used. Does the system require any internal or external hardware modifications? For example, is a microcomputer chip that contains portions of the system software necessary for operation of the system? Or, are keyboard modifications necessary? If so, list the hardware and software components that you will supply as part of the package, as well as any boxes, canisters, envelopes, or other materials to protect the hardware and software components.

Our list of related materials for the APL*PLUS/80 included a software disk in a protective envelope, a hardware chip inserted into non-conductive foam and contained in a small plastic canister, and a set of adhesive keyboard labels.

Add to your list any documents necessary to explain the rights and obligations of your company and the purchaser regarding the product. Are you licensing all or part of the documentation? If so, list a licensing agreement to be signed by the purchaser and returned to your company. Are there any warranties (such as the system's fitness for a particular purpose or freedom from defects) that must be stated? If there are, include a warranty statement on your list.

Next, decide whether contact with the purchaser after the sale is desirable. If you want the ability to send out system update information, newsletters, or even promotional brochures for other company products, you'll need to maintain an accurate mailing list; add a user registration card and change of address card to your list.

For the APL*PLUS/80, we listed a combination warranty and license statement, a combination license and registration card, and change of address cards.

Finally, include any materials that will be used in the packaging of your documentation. The list may include binders, index tabs, document covers, cover art, and illustrations.

COMMITMENT - THE KEY TO A SMOOTH RACE

Armed with the plethora of information gathered at the initial project planning meeting, the publications contact person should develop a formal memo restating the conclusions agreed upon: the target market description, the list of documents needed and the goals of each document, the related materials to be included in the package, and the responsibilities of each participant. Route the memo to all meeting participants and have them indicate their agreement with and commitment to the goals with a formal sign off. You now have a roadmap to your marathon -- a concrete set of tasks to be performed that have been agreed to by all involved parties.

JUDGING A BOOK BY ITS COVER

Once you have a roadmap to your adventure, you must determine your strategy for the race. Decide how the documents will fit together into a single package. Develop a diagram of all package components, and try to depict how these materials will be merged into the package. You may have to modify some earlier printing and binding decisions as a result.

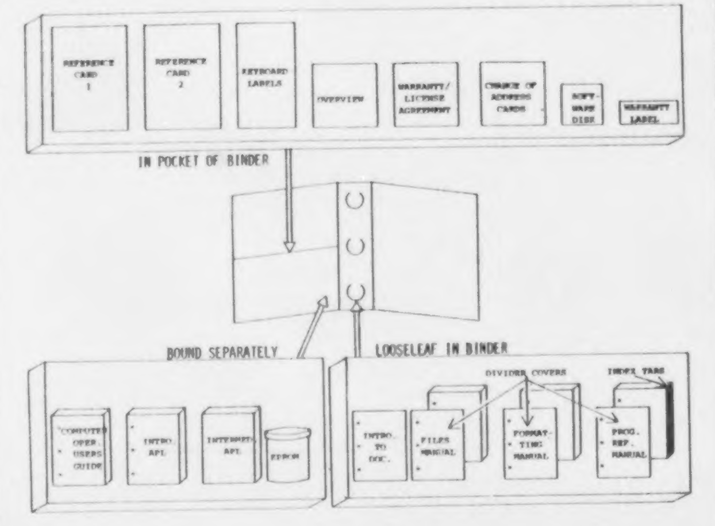


Figure 2. Packaging Diagram

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For the APL*PLUS/80, we decided to provide all materials in a single, shrink-wrapped three-ring binder. Materials were organized as depicted in Figure 2. Binding some of the materials separately allowed us to use a two-inch binder rather than a three-inch binder (which would be cumbersome if not downright threatening to a novice user).

Have your contact person in development approve the completed diagram.

IF IT'S TUESDAY IT MUST BE...

Now that the entire project team has its work defined and understands how the components will fit together into a package, develop initial schedules and use them as a basis for requesting necessary resources.

First, develop a materials schedule by establishing availability dates for every item in the package. It's senseless to write feverishly to meet a deadline when the binders that hold the documents won't be ready for another month. List all elements of the package -- documents, artwork, front and back covers, dividers, index tabs, warranty and license agreements, hardware and software components, and so on. For items you must order through vendors, list required lead time for delivery and the person responsible for ensuring the delivery of each item. This part of the materials list provides you with a handy chart for developing a timetable for placing orders -- an important benefit if your storage space is limited and you prefer to wait until absolutely necessary before ordering supplies. Figure 3 shows a portion of the APL*PLUS/80 materials schedule.

APL*PLUS/80
MATERIALS SCHEDULE

TIME	DESCRIPTION	RESPONSIBLE
4 - 6 wks	2" binders, sealed rivets, front spine overlays, horizontal inside front pocket	CLK
2 wks	binder cover and spine art	CLK
	Introduction to Documentation	CLK
	Files Manual	DME
	Formatting Manual	DME
	Programmers Reference Manual	DME

Figure 3. Materials Schedule

For items to be produced by the publications group, indicate an availability date and the individual responsible for ensuring the delivery of each document. But how do you establish these dates? And, how can you determine what resources the project demands?

In the Publications Department at STSC, we have gathered and analyzed our production data over the past few years, and developed expectations for our writer/editor and production personnel according to the work classification of the document being produced. Our work classifications -- quick edit, edit, and write -- include producing camera copy from online files, preparing front and back matter, and reproducing the document. Each work classification as described in Figure 4 below includes responsibilities of the previous classifications.

QUICK EDIT	involves editing an existing document for spelling, grammar, format, consistency, house style, and legal issues (trademarks, copyrights, and licensing). The writer/editor may point out problems with organization, completeness, and clarity, but does not correct the problems. The writer/editor also verifies examples for consistency; that is, for errors that can be detected without executing the examples on the system.
EDIT	involves editing an existing document for organization, clarity, and completeness, and writing new text to fill in gaps. The writer/editor generally verifies examples by executing them on the system, and may develop some new examples.
WRITE	involves developing a document from scratch using a four-step approach: outline -- blueprint -- draft -- final. The writer/editor works closely with the product manager, and incorporates examples supplied or develops examples.

Figure 4. Work Classifications

Using the average production rates presented in Figure 5, and the document definitions and estimates of document length formulated in the initial project planning meeting, you can calculate the approximate number of hours necessary to produce each document. You should note that the production rates in Figure 5 are influenced by high standards of document quality.

	QUICK EDIT	EDIT	WRITE
SR. WRITER/EDITOR	1.2 hrs/pg	2.6 hrs/pg	6.9 hrs/pg
WRITER/EDITOR	1.3 hrs/pg	2.8 hrs/pg	7.6 hrs/pg
ASSOC. WRITER/EDITOR	1.5 hrs/pg	3.1 hrs/pg	8.3 hrs/pg
SR. PUBLICATIONS ASSISTANT	.7 hrs/pg	1.4 hrs/pg	2.8 hrs/pg
PUBLICATIONS ASSISTANT	.8 hrs/pg	1.5 hrs/pg	7.6 hrs/pg
ASSOC. PUBLICATIONS ASSISTANT	.8 hrs/pg	1.7 hrs/pg	3.3 hrs/pg

NOTE: These rates include overhead

Figure 5. Average Production Rates

Keeping in mind the product release date established at the initial project planning meeting, group the documents into achievable units of work for both writer/editors and production personnel. The number of work units resulting from your grouping efforts establishes the resources within the department that are necessary for the project. Once the necessary publications resources are committed to the project and you have allocated work units to them, complete the materials schedule by indicating the availability date and individual responsible for ensuring the delivery of each document.

Next, prepare detailed document schedules. Although the responsible writer/editor must set dates based on his total workload, the publications contact person must ensure that realistic schedules are established and met. Detailed document schedules should include dates for completion of outlines, drafts, and the final version of the document; technical reviews; production of camera-ready copy; and delivery of the document to the printer. The publications contact person also ensures that copies of the detailed document schedules are updated and distributed to everyone weekly.

The final schedule is an overview schedule for all project documents, like the schedule in Figure 6. By laying out the detailed document schedules in columns, conflicts in resources are readily apparent. For example, it may be unrealistic to expect the same person to participate in two document reviews at the same time. When conflicts in document schedules arise, discuss the situation with the responsible writer/editors. The problems can usually be resolved by shifting a single schedule date by one or two days. With a minimum of juggling, schedules can be made to dovetail with the available resources.

	COMPUTER OPERATION USERS GUIDE	INTRODUCTORY APL TEXT	PROGRAMMERS REFERENCE MANUAL
WRITTEN BY	CLK	JMT	-
OUTLINE COMPLETION DATE	1-4	1-7	-
OUTLINE REVIEW BY	BAS,JCW,JMS,JWM,LAR	BAS,JCW,JMS,JWM,LAR	-
REVIEW COMMENTS TO DEVELOPMENT CONTACT	1-6	1-12	-
FINAL OUTLINE VERSION TO PUBS	1-8	1-25	-
BLUEPRINT COMPLETION DATE	1-22	3-10	-
BLUEPRINT REVIEW BY	BAS,JCW,JMS,JWM,LAR	BAS,JCW,JMS,JWM,LAR	-
REVIEW COMMENTS TO DEVELOPMENT CONTACT	1-27	3-15	-
FINAL BLUEPRINT VERSION TO PUBS	2-2	3-18	-
DRAFT SUPPLIED TO PUBS BY	-	-	DEVELOPMENT
DRAFT COMPLETION DATE	3-10	4-7	2-9
DRAFT EDITED BY	-	-	DME
DRAFT EDIT COMPLETION DATE	-	-	2-19
DRAFT REVIEWED BY	BAS,JCW,JMS,JWM,LAR	BAS,JCW,JMS,JWM,LAR	DEVELOPMENT
REVIEW COMMENTS TO DEVELOPMENT CONTACT	3-22	4-12	2-26
FINAL DRAFT VERSION TO PUBS	3-31	4-14	3-1
CAMERA COPY COMPLETION DATE	4-16	4-20	3-15

Figure 6. Overview Schedule

The overview schedule should also be updated weekly. The overview schedule will highlight any new resource conflicts that arise as a result of the weekly detail schedule update. Again, discuss and resolve conflicts with the responsible writer/editors. Distribute revised copies of the overview schedule weekly.

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ON YOUR MARK...

Now that you've developed the roadmap and strategy for your marathon, the actual race becomes a series of steps, one after the other. That's not to say that the road will always be perfectly smooth, but you'll recover more easily from the bumps that you do hit.

THE FINISH LINE

Any documentation project can run more smoothly with adequate preparation before the writing begins. In general, preparation requires communication, agreement, commitment, organization, and scheduling. Specifically, the key elements of preparation (as followed on the APL*PLUS/80 project are

- contact persons in publications and development
- an initial project planning meeting to define the target market, major and related documents, and related materials
- written agreement and commitment to the goals by all parties
- a packaging diagram approved and committed to by both contact persons
- a materials schedule approved and committed to by all parties
- detailed document schedules approved and committed to by all parties
- an overview schedule approved and committed to by all parties
- weekly detail and overview schedule updates distributed to all parties.

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MODULAR SOFTWARE USER DOCUMENTATION

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Software documentation provides the user with a map of a software system. Without this map, or with a confusing one, the user cannot achieve results from the system. A user who has paid for a system but cannot produce work on it is an unhappy and frustrated customer, not a repeat sale. Modular software user documentation can make or break a product. It should be a prime vendor product, not afterthought or a nuisance.

Suppose you have received a graphics software package. Included will be the software, that is, the programs; and a copy of the software user documentation. You need the programs to do the work. You need the user documentation to know how to use the programs. Having a program with inadequate user documentation is like having a car in which you want to go from Georgia to Utah but not having a map. You may eventually get to Utah, but it would cost you much frustration, time, and money.

Software user documentation is your map. But viewed from the vendor's standpoint, the software user documentation can be the software vendor's prime marketing tool. It can make or break the product, though this is typically not recognized. The user documentation is usually an afterthought for the vendor; a relatively unimportant nuisance item that has to be done, akin to attaching the tail to the body of the dog. But think about it; think about your response as a user to the frustration in trying to use a new program without good user documentation. Maybe the user documentation is really the dog's head, with all the importance which that implies.

For example, I know of a company that bought a software package for their technical writers. The package was supposed to reformat program listings to make the computer language (code) easier for the writers to read and understand. However, the writers could not understand the documentation that came with the package. Even the vendor's technical representative did not understand the documentation. The result was an unhappy customer and a technical representative spending his time trying to explain programs already bought instead of spending his time contacting potential customers.

How does one create this marketing tool - the user documentation? To answer that question, I will transmute you into a writer and have you accompany me through the development and production of the DATAGRAF User's Guide (DATAGRAF is a statistics and color graphics package and is a proprietary product of M/A-COM Sigma Data, Inc.)

The first thing you want to do is find out what DATAGRAF is and how it works. You, as the writer, must know how to use the software, though not be expert in it, before you write about it. This may seem to be stating the obvious, but the mechanics of achieving that knowledge is often complex. You can interview the analysts and programmers, study listings, read notes, memoranda and preliminary documentation, and speak to sales people associated with the product. How you apportion what is always a limited amount of your time among the foregoing alternatives varies from project to project.

It is also crucial that you clearly identify the audience for whom you will be writing. The marketing success of the product can hinge on this alone. You need to know what educational and professional level you are writing to. The best source for this information is usually product managers and the sales people. They are the ones in contact with the customer and should, but do not always, understand his needs. Interestingly, this information, as initially received by you, is often nebulous and adroit questioning is often required. Sometimes, but not frequently, the best situation is when you can interview the customer directly, at the beginning of the work. This must be handled judiciously, for often the customer doesn't know enough about software, or even his needs, to provide you with as much information as your own sales people who have interacted with customers with similar needs.

Now that you have sufficient understanding of the software and a knowledge of your audience, you can begin identifying where the documentation has to be finely detailed and where you can condense. You want the documentation to be as brief as possible, consistent with clarity. You don't want the user awed by a monster size document nor do you want the cost of such. Thus, you must sit down at a terminal and work through the programs. You will make mistakes, but that is a critical part of user document development. Through this, you will rapidly learn where an inexperienced user is likely to make errors and can structure your documentation to help avoid those mistakes. You are in a unique position here - you are your audience. Listen to your own questions; your questions are likely to be customer questions. Be sure you answer them - keep a running record. You will soon become sufficiently proficient on the software as a novice, and a somewhat experienced user to write your user's guide. There is no need to become expert. Plan on writing between two and five drafts, depending on the software.

You will frequently find that the software is being developed at the same time you are writing your guide. Both often have the same customer due date. If this is the situation, the only certainty is that more drafts will be necessary, since the programs will change as you are writing.

The DATAGRAF software was written as twenty program modules. This was because some customers were expected to buy one subset of the set of modules, while other customers were expected to buy other subsets. The most effective approach for you as a writer, in such a case, is to create a modular software user's guide. A modular user's guide is written so that individual chapters of the guide can stand alone from other chapters, just as each program can work independently of the others. This introduces some redundancy, but the redundancy costs little more than the price of the printing. And it can have a big payoff in ease of customer understanding and use, which is crucial.

The foregoing, in brief, are the basic steps in developing the user documentation as a marketing tool, the head of the dog not the tail. User documentation can be a major software marketing tool. It can also free the technical representative to sell potential customers. The greatest program in the work will not sell if the potential user can not easily understand how to use it. But make it easy for the potential customer with effective documentation and it will be a million-seller.

PRINTOUTS PROVIDE GOVERNMENT, CUSTOMER & PUBLICATION ANALYSIS

Shirley S. Platt

Pratt & Whitney Aircraft

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P.O. Box 611
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29th ITCC Award for "Distributing Publications: It's All On The Tube"

Within our Data Base System used to control and distribute government publications and status reports, five reports are generated. They satisfy a government requirement for publication control and enhance our ability to effectively plan and implement decisions affecting publication distribution.

The reports for presentation to the user are:

- *(a) Specific Address Record - listing all publications each address receives*
- *(b) Customer Profile - listing all address records for a particular customer*
- *(c) Publication Code Profile - listing all addresses receiving a particular publication*
- *(d) Publication Index - showing total media (i.e. microfilm, micromaster, paper) requirements for all publications*
- *(e) Microfilm Production Report - showing specific address records and what type of microfilm they require.*

This paper will be divided into five sections with each one explaining in detail a specific report, its applications and usefulness, and possible future programming to enhance its usability.

INTRODUCTION

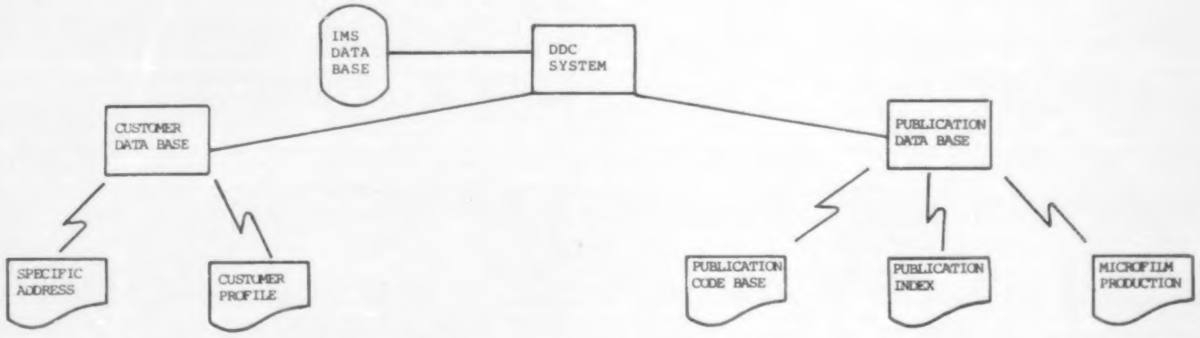
Pratt & Whitney Aircraft Group manufactures aircraft engines. I work for the Publications department which is under government contract to write military engine publications; however, the government prints and controls the distribution of them. Under the assignment of a distribution account, I am able to order, receive, and distribute manuals used by our field representatives and internal departments. The reports generated from my automated system satisfy the policies and procedures of agencies that require technical documents.

SYSTEM DESCRIPTION

The computerized Document Distribution System (DDC) uses IBM's Information Management System (IMS) for management and support of technical publications and individual customer requests for distribution. The system uses two data bases to maintain distribution related information:

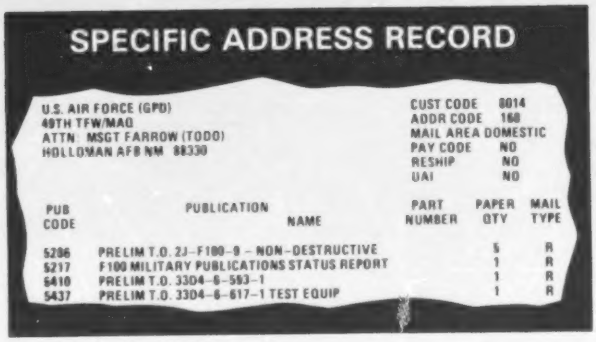
> Publication Data Base - contains publication name, description, part number, and total quantity of each publication being supported.
>
> Customer Data Base - contains customer's name, his individual mailing address, the publications distributed, as well as the media requirements.

On line access to these data bases provides inquiry & file maintenance capability. Daily batch processing programs provide cross reference reports and labels for mailing. IBM's format message service (FMS) handles screen formatting.



SPECIFIC ADDRESS RECORD

The Specific Address Record is a listing of all publications a particular address code receives. It shows their complete mailing address record and individual publication requirements. The address records show a complete mailing address, as well as the customer code and address code their records are located in the computer. The mail area (domestic, foreign or internal) is given next. The Pay Code, Reship and UAI are sorting functions to provide exception reports required by internal departments. A publication code assigned to each manual is followed by a description or name assigned to it. If it has an assigned part number this will appear next. The quantity of paper copies required is listed followed by the mail type (airmail, internal or regular). This Specific Address Record will provide an output of all publications forwarded each address record.



SPECIFIC ADDRESS RECORD

U.S. AIR FORCE (GPD)
49TH TFW/MAQ
ATTN: MSGT FARROW (TODO)
HOLLOMAN AFB NM 88330

CUST CODE 0014
ADDR CODE 168
MAIL AREA DOMESTIC
PAY CODE NO
RESHIP NO
UAI NO

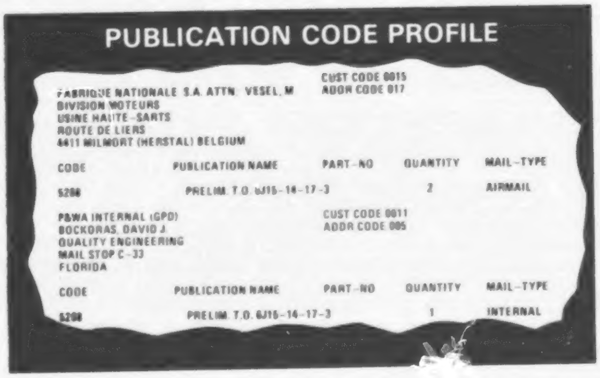
PUB CODE	PUBLICATION NAME	PART NUMBER	PAPER QTY	MAIL TYPE
5206	PRELIM T.O. 2J–F100–9 – NON-DESTRUCTIVE		5	R
5217	F100 MILITARY PUBLICATIONS STATUS REPORT		1	R
5410	PRELIM T.O. 33D4–6–553–1		1	R
5437	PRELIM T.O. 33D4–6–617–1 TEST EQUIP		1	R

CUSTOMER PROFILE

The Customer Profile Report provides a listing of all address records for a given customer data file. It will show all specific address records and publication requirements for that addressee. For example, one government facility (the customer file) might require many address records (the address file). This listing is periodically forwarded to each customer so that they might update their requirements.

PUBLICATION CODE PROFILE

The Publication Code Profile is a run of a specific publication. It shows each customer code number and each specific address file. It provides a complete address listing along with the quantity of copies provided and the mail-type area. The files are sorted in ascending order by customer code. This report can help us forecast an estimate of the delivery costs of forwarding this publication as well as an accurate picture of who receives each copy. It is provided to government agencies to satisfy controlled distribution requirements.



PUBLICATION CODE PROFILE

FABRIQUE NATIONALE S.A. ATTN: VESEL, M
DIVISION MOTEURS
USINE HAUTE-SARTS
ROUTE DE LIERS
4411 MILMORT (HERSTAL) BELGIUM

CUST CODE 0015
ADDR CODE 017

CODE	PUBLICATION NAME	PART-NO	QUANTITY	MAIL-TYPE
5208	PRELIM. T.O. 6J15-14-17-3		2	AIRMAIL

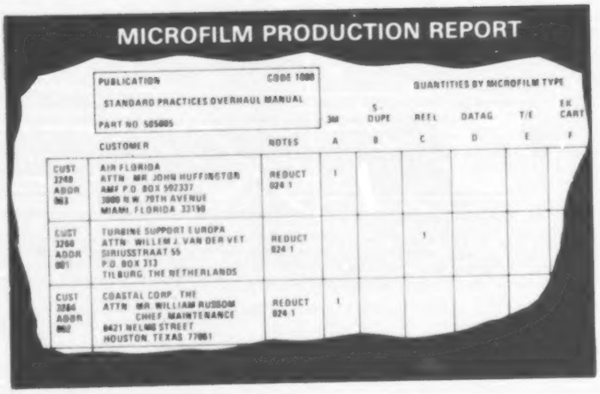
P&WA INTERNAL (GPD)
BOCKORAS, DAVID J.
QUALITY ENGINEERING
MAIL STOP C-33
FLORIDA

CUST CODE 0011
ADDR CODE 005

CODE	PUBLICATION NAME	PART-NO	QUANTITY	MAIL-TYPE
5208	PRELIM. T.O. 6J15-14-17-3		1	INTERNAL

MICROFILM PRODUCTION

Our Microfilm Production Report is generated to identify all microfilm users of a specific publication. It first lists each customer address code and the complete mailing address. A note display allows input for the reduction factor ratio required by that customer. At the end of the report, totals are given for each type of microfilm media required. These totals provide the microfilm vendor verification of how many copies of each media type are required. This report and a set of labels are provided to our microfilm vendor to instruct him on what types of microfilm to produce and where to send it.



MICROFILM PRODUCTION REPORT

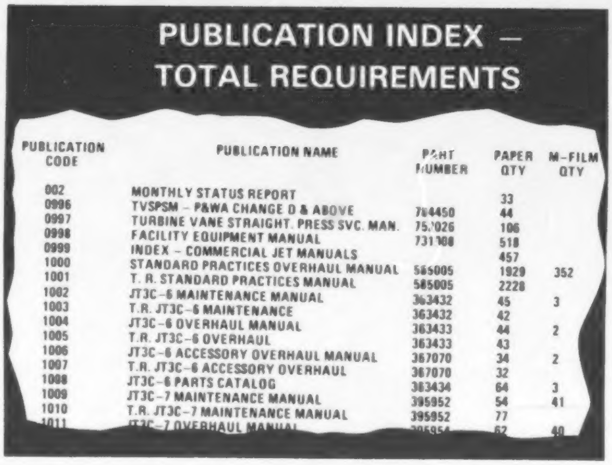
PUBLICATION CODE 1080
STANDARD PRACTICES OVERHAUL MANUAL
PART NO 585005

QUANTITIES BY MICROFILM TYPE

	CUSTOMER	NOTES	3M A	S-DUPE B	REEL C	DATAG D	T/E E	EK CART F
CUST 3240 ADDR 003	AIR FLORIDA ATTN MR JOHN HUFFINGTON AMF P.O. BOX 592337 3000 N.W. 79TH AVENUE MIAMI, FLORIDA 33159	REDUCT 024 1	1					
CUST 3260 ADDR 001	TURBINE SUPPORT EUROPA ATTN: WILLEM J. VAN DER VET SIRIUSSTRAAT 55 P.O. BOX 313 TILBURG, THE NETHERLANDS	REDUCT 024 1			1			
CUST 3284 ADDR 002	COASTAL CORP., THE ATTN: MR WILLIAM RUSSOM CHIEF MAINTENANCE 8421 NELMS STREET HOUSTON, TEXAS 77061	REDUCT 024 1	1					

PUBLICATION INDEX - TOTAL REQUIREMENTS

The Publication Index report is a complete listing of all publications listed on system, a description of each publication, its part number, and the total media requirements. This report is especially helpful to our mailroom for job estimates and scheduling of work. The files are sorted in ascending order by publication code number. Exception reports can also be generated to list only those who require microfilm.



PUBLICATION INDEX –
TOTAL REQUIREMENTS

PUBLICATION CODE	PUBLICATION NAME	PART NUMBER	PAPER QTY	M-FILM QTY
002	MONTHLY STATUS REPORT		33	
0996	TVSPSM – P&WA CHANGE D & ABOVE	784450	44	
0997	TURBINE VANE STRAIGHT. PRESS SVC. MAN.	752026	106	
0998	FACILITY EQUIPMENT MANUAL	731108	518	
0999	INDEX – COMMERCIAL JET MANUALS		457	
1000	STANDARD PRACTICES OVERHAUL MANUAL	585005	1929	352
1001	T. R. STANDARD PRACTICES MANUAL	585005	2228	
1002	JT3C–6 MAINTENANCE MANUAL	363432	45	3
1003	T.R. JT3C–6 MAINTENANCE	363432	42	
1004	JT3C–6 OVERHAUL MANUAL	363433	44	2
1005	T.R. JT3C–6 OVERHAUL	363433	43	
1006	JT3C–6 ACCESSORY OVERHAUL MANUAL	367070	34	2
1007	T.R. JT3C–6 ACCESSORY OVERHAUL	367070	32	
1008	JT3C–6 PARTS CATALOG	363434	64	3
1009	JT3C–7 MAINTENANCE MANUAL	395952	54	41
1010	T.R. JT3C–7 MAINTENANCE MANUAL	395952	77	
1011	JT3C–7 OVERHAUL MANUAL	395954	62	40

SOME OBSERVATIONS

Electronic transmission using hard copy reports is the only electronic message system that is within the financial reach of the vast majority of communicators. If we are going to focus our attention on proper planning for change, there is every reason to expect our system can handle change in a manner that will benefit all. Providing people only the information needed for each particular situation saves time and helps the user make a decision without scanning information not pertinent to their needs.

FUTURE

As computer technology expands to include every phase of a publication department, programming needs are also expanding to include printouts and reports that organize and control the data produced. The data which is provided by an inquiry program can be arranged in different sequences for presentation to the user. In summary, then, a report that shows only what we need to know "emphasizes professionalism".

CLASSIFYING ON-LINE DOCUMENTATION SYSTEMS

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ABSTRACT

As computing capabilities increase, our methods of designing and documenting products and systems are changing. Today, for example, many organizations are using the computer to generate their documentation.

This talk describes and discusses a model for classifying existing computer-based approaches to the documentation life cycle. In particular, I will be addressing *on-line* documentation systems, or those specifically designed to prepare, transmit, and display text and graphics for the user. Basically, my model identifies unique characteristics of the different types of approaches to on-line documentation. Topics covered in my talk include:

- The numerous definitions of what constitutes on-line documentation.
- Basic distinctions between information obtained from the system and information needed to use the system.
- How stand-alone documentation systems differ from embedded systems.
- Some current practices of handling on-line documentation, such as error message and user manuals, and error correction procedures.
- System tools and features provided for the user, such as menus, on-line training, HELP messages, and intelligent context searches.

AN INFORMATION MANAGEMENT SYSTEM FOR A VARIETY OF USERS AND MEDIA

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Member of STC since 1977.

ABSTRACT

The Information Age is making strong demands on our profession. The Technical Publication Department of Bell Laboratories is meeting this demand by automating the publication process, from writing to distribution. This paper describes the basic concepts used to develop the Publication Management System: the modular arrangement of the system, which allows the documentation process to be automated gradually; the ease of retrieving specific or general information; and the use of conversational English for system prompts and responses. The author also comments on ways to evaluate the success of an information management system and the associated problems of automating documentation.

According to the Oxford English Dictionary, a system is an organized or connected group of objects. At Bell Laboratories, there is a system for technical communication consisting of the following connected, if not always organized, objects: The scientists and engineers who design our technologies; about 150 technical communicators: and an audience ranging from engineers to craftspeople to buyers of telecommunications products.

Until recently, this has been a manual system: Engineers scrawled memoranda and notes and gave them to someone to type. Writers gathered source information from engineers' notes, memoranda, previously published documents and interviews, and assembled a file of information from which they wrote new manuscripts. These manuscripts were turned over to someone else to typeset, and yet someone else to print. A very labor-intensive, cumbersome system —one we decided to modernize.

How To Automate?

As more and more of Bell Laboratories' — and the world's — business is conducted electronically, automation of technical information becomes inevitable. The question no longer is *whether* to automate, but rather *how:* How do you design a system for people who may never have used a computer? How do you entice creative types who are reluctant to trade in their pencils or typewriter? How do you convince writers that working at terminals is not just for word processors? How, with the same system, do you keep the interest of the hackers, who already know more about computers than you need to? Most important, how do you make sure that the new system enhances productivity without constraining creativity?

Basic Concepts in Our System

In considering these questions, we defined some concepts that were instrumental in the success of our project to date:

1. We will design and implement our system in modules, gradually automating portions of the current documentation process. The most logical place to start was an information storage and retrieval system. By designing that first, we would be able to test some of our ideas without disrupting the work of the organization.

2. A retrieval system must be flexible enough to accommodate a variety of search styles. We know from human factors research that, just as people do not all think alike, they do not all structure a search for information in the same way. Research also tells us that the most natural way of searching for information at a terminal is by keyword, except if something is known about the information source, in which case a menu is helpful.

3. We are in the information business, not the document business. That probably sounds like heresy to this group, and perhaps it is. But we are concerned that people seeking information should be able to retrieve just that information, without knowing what document it comes from or how it is stored in the data base, and without having to retrieve the entire document. A fundamental concept in our storage and retrieval system, therefore, is the information unit: the smallest self-contained meaningful passage of text —frequently a paragraph. Each information unit has one or more labels describing its content and format. These labels provide one way to retrieve the information.

4. The only language a user must know is English. We have found that command languages are forbidding to people who are not computer professionals, and since our retrieval system was designed primarily for our writers and editors, all communication with the system is in conversational English. The user responds to prompts from the system by pressing a function key or entering a word or two. In fact, even the names of the system modules are descriptive labels, as you will see.

System Modules

Our complete Publication Management System will consist of five modules. Figure 1 shows the development status of these modules and the flow of information among them.

CREATE is a collection of electronic tools, like the Writer's Workbench developed at Bell Labs[1] to help our staff write and edit manuscripts, and to help our managers budget and track work in progress. On-line templates that display heading structures for standard documents will relieve writers of format considerations. All they will have to do for a particular document is fill in the blanks.

PRODUCE is an interactive system for electronic composition and page makeup. This module will facilitate the integration of text

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[1] Proceedings, 29th International Technical Communication Conference, May 5-8, 1982.

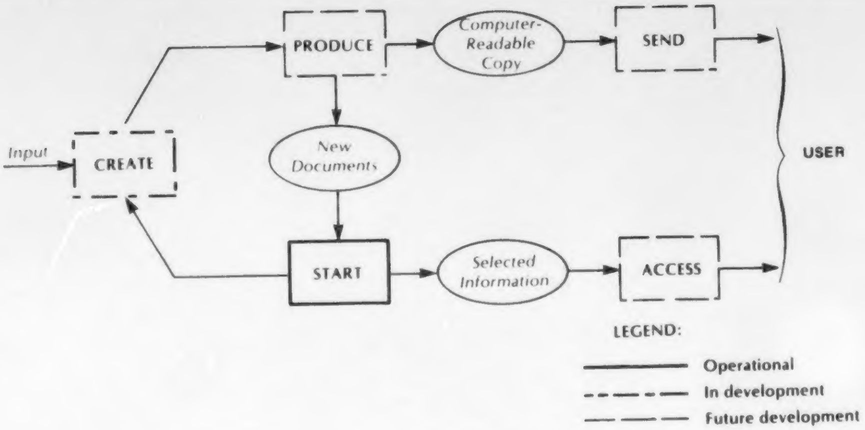


Figure 1. Publication Management System: Modules and Information Flow.

and graphics, and will format copy for electronic distribution or for hard-copy printing.

SEND is a system for the electronic distribution of documents. It also maintains distribution lists and prepares mailing labels if printed copies are required.

START is a full-text storage and retrieval system that serves as an information resource to our staff in their writing projects, and is increasingly sought after as a stand-alone system by other organizations.

ACCESS allows end users access to full documents or to information units in a START data base as appropriate to meet their needs and security requirements.

Access Levels Oriented to the User

With these guidelines in mind, then, we devised a user-oriented system; a data base that is accessible at three different levels, from macro to micro. At the macro level, you can scroll through a menu of documents and retrieve an entire document. You can have it copied into another file or printed, either at your terminal or at an off-line printer. At the middle level, you can retrieve information units by searching for their labels describing either content or format. And at the micro level, every substantive word in a data base is treated as a keyword, and the user can retrieve information by searching for keywords, or keywords and unit descriptors, in any order and in any combination.

The system will search on root words and headings or titles. Inexperienced users can use function keys to issue commands and enter queries with relative ease. Sophisticated users can use Boolean connectives to narrow their searches. *Retrieve*, the module of START that is visible to the user, is easy to use and contains an on-line tutor for self-paced learning. The system can be accessed from intelligent or dumb terminals. And it can accept on-line feedback.

All in all, it's a well human-engineered system. But traditional human factors psychology is only a cosmetic layer — the interface —between a system and its users. The arrangement of screens, the naming of commands, the labeling of function keys, the helpfulness of error messages, important as they are, do not really affect the accuracy of a system. Even with a system as technologically sophisticated as START, with its state-of-the-art search algorithms and data structures, the accuracy of output — how well the system answers queries —depends inevitably on the precision of input. We know all about that: garbage in garbage out. Let's look behind those words at some implications for all information management systems.

Inherent Problems of Information Systems

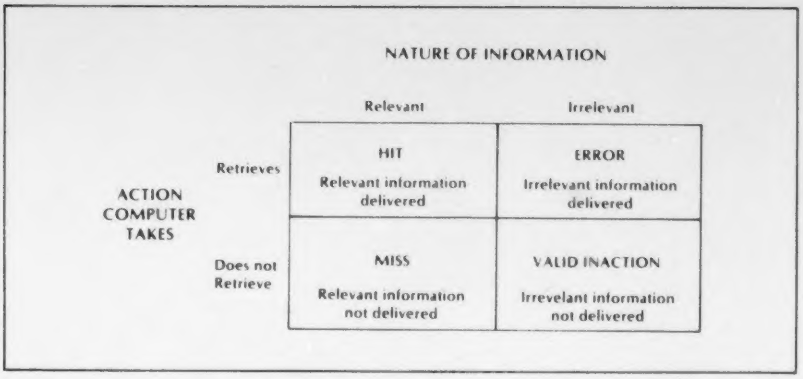
I'm convinced that the biggest problems in information retrieval are not technical, they are psycholinguistic. Today, the success of a system depends mainly on the good judgement and linguistic intuition of the people attaching the labels. Judgement and intuition are hardly qualities you would associate with automation, considering the rich diversity of our vocabulary and the capabilities for abstraction within any population. Most of us are aware of regional differences in terminology and, indeed, it is quite possible to program a computer to retrieve the same information whether a user asks for scissors, a pair of scissors, shears or snips. But, how do you teach a computer to differentiate when one word has many meanings? And it is an altogether different matter when a user speaks figuratively about a house as a dwelling, a shelter, a tax shelter, an investment, or a monthly expense. How do you anticipate a user's level of abstraction? Or subjectivity? When labels embody value judgements, they are meaningful only to those who hold the same values. Such selectivity severely limits the usefulness of a data base.

It's In the Labels

Clearly the success of an information retrieval system depends on the meaningfulness of its labels. A label has meaning only if different people can use it to retrieve the same information units. The more user-friendly a system is, and the more flexible its search capability, the more tolerant it must be of differences among users.

Assuming we've defined and applied labels as precisely and objectively as humanly possible, and I believe that will always be a human function, how do we measure our success? Traditionally — if such a young technology can be said to have a tradition — the effectiveness of a system has been judged by the number of responses, or hits, it supplies in answer to a query. If you are looking for information about a power amplifier, and the system responds with 17 hits, you may think, "That's terrific; there are 17 information units on power amplifiers." But actually, you really only know that the computer found 17 information units that are labelled "power amplifier." In evaluating retrieval systems, we have to measure not only hits, but also misses and errors.

In a retrieval system, there are four possible responses to a query (see Figure 2). If the requested information is present in the data base



NATURE OF INFORMATION

ACTION COMPUTER TAKES	Relevant	Irrelevant
Retrieves	HIT Relevant information delivered	ERROR Irrelevant information delivered
Does not Retrieve	MISS Relevant information not delivered	VALID INACTION Irrevelant information not delivered

Figure 2. The four possible system responses.

and the system responds affirmatively to the query, then that is a valid hit. If the information is *not* in the data base, but the system indicates a hit, that's an error, and you'll soon find that out because you will be retrieving irrelevant information. Similarly, if the information is not in the data base, and the system shows no hits, that's valid inaction. You will know that you are not getting errors — you won't be retrieving irrelevant information. However, if the information *is* in the data base and the system does not find it, that's a miss, and, to coin a phrase, "you'll never know what you're missing."

It's clear, then, that to measure the performance of a retrieval system we must consider more than just the number of hits. We must think about the relative frequencies of all four types of responses. The systems we design must maximize the hits and valid inaction and minimize misses and errors. Because of inherent tradeoffs in the process, that's easier said than done. To maximize hits, you necessarily increase errors. To minimize errors, you maximize valid inaction, thereby increasing the incidence of misses. The trick is to find a balance in which each response type has an optimal relative frequency. That balance must be achieved by adjusting the labels, not the hardware or software.

The importance of labels to an information retrieval system is obvious. Labeling today is an art, but it needs to become more of a science. I am hopeful that future research in both linguistics and psychology will lead to a labeling strategy — a set of rules to supplement the judgement and intuition we rely on today. The necessary research, obviously, must come from specialists, and we are fortunate at Bell Labs to have groups addressing such problems. In the meantime, what can we as professional communicators do to contribute to the solution rather than to the problem?

It's clear, then, that to measure the performance of a retrieval system we must consider more than just the number of hits. We must think about the relative frequencies of all four types of responses. The systems we design must maximize the hits and valid inaction and minimize misses and errors. Because of inherent tradeoffs in the process, that's easier said than done. To maximize hits, you necessarily increase errors. To minimize errors, you maximize valid inaction, thereby increasing the incidence of misses. The trick is to find a balance in which each response type has an optimal relative frequency. That balance must be achieved by adjusting the labels, not the hardware or software.

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Our Responsibilities to the Information Age

We must make the transition today from the paper world to the electronic world. We must evolve standards that will work for on-line information and follow them now in our paper documents. All of our documents will have to become more modular, not just in format, but in the presentation of ideas. We will no longer be able to rely on context for meaning; each information unit will have to contain its own context. A topic sentence may actually become a topic sentence again!

Obviously, I look at this in a positive light. If we as writers know that our documents will be retrieved electronically, and if we have some understanding of the retrieval process, then we are less likely to write poorly structured information to begin with. After all, we don't want our own prose to be irretrievable. I see the automation of documentation, therefore, as a way to end verbal sprawl, regardless of the output medium.

Acknowledgement

My thanks to M. K. Singley for sharing his thoughts on research.

MECHANIZING DOCUMENT DISTRIBUTION

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ABSTRACT

This paper examines the method used by Western Electric's Information Distribution Center for distributing Bell System documents throughout the Bell System. The 9-digit numbering plan relied on to identify Bell System Practices for mechanized paper distribution is given. Also presented are the two types of ordering systems employed to obtain Bell System Practices. The paper concludes with a discussion on the disadvantages of distributing Bell System Practices in paper form and the advantages of distributing them electronically.

INTRODUCTION

The Bell System is the largest private enterprise in the world, with over one million employees and over three million stockholders. To disseminate the technical, training, administrative, and marketing information necessary to conduct this telecommunication business is a sizable task. Further, as the Bell System undergoes transformations as a result of recent FCC and Justice Department actions, efficient distribution of information will be necessary to minimize transitional problems and ensure organizational success. This paper describes the scope of that information distribution chore, the basic concepts used to organize Bell System documents for mechanized paper distribution, and the future of electronic information distribution in the Bell System.

BACKGROUND

Documentation for the Bell System may originate from Bell Laboratories, AT&T, AT&T Long Lines, the Bell Operating Companies, Western Electric, or other vendors. Regardless of its origin, Western Electric's Information Distribution Center distributes most of the technical documentation. It ships to over sixty thousand customer addresses, and it stocks over 130,000 individual documents to support the System.

The Bell Operating Companies are the largest consumer group for documents used in the Bell System. However, a significant amount of documentation is also needed by the over 200,000 employees of AT&T Long Lines, AT&T International, Bell Laboratories, and Western Electric and its subsidiaries.

Since many sources produce and distribute Bell System documents, it is a challenge to keep customers aware of what documentation is available and to provide it when needed. Without delivery standards, methods, and routines to mechanize the information distribution process, getting the right information to the right location at the right time would be very difficult. Therefore, the System uses a numeric or alphanumeric identification scheme to classify information and permit computerization of catalog, order entry, billing, and inventory management activities.

BELL SYSTEM PRACTICES

Among the largest categories of documentation in the Bell System are Bell System Practices (BSPs). These are documents authorized by AT&T as the recommended instructions and criteria for planning, engineering, installing, operating, and maintaining communications facilities. The subjects covered range from business information systems and administrative routines supporting operational functions to equipment in the outside plant. (Outside plant includes all of the telephone hardware used to connect subscribers to switching offices, and switching offices to one another. Aerial cable, buried cable, and distribution terminals are examples of this hardware.) There are almost forty thousand BSPs, and each week twenty-seven thousand customers, on the average, receive from one to all of nearly one hundred new or revised BSPs.

A 9-digit numbering plan, for example 751-410-101, is used to identify BSPs. It provides uniformity and flexibility in the classifying of practices and also a convenient means for ordering and distributing them. In this numbering plan, the first three digits are referred to as a division number. The 9-digit numbering plan uses division numbers to designate major categories of information. In the case of BSP 751-410-101, 751 indicates that the practice belongs in the major category called Business Information Systems (750 through 759). Specifically, it is part of the Common Language division (751) within the Business Information Systems category. (Common Language BSPs contain the standard codes and abbreviations used in the Bell System.) The second three digits provide a means for breaking down a division into subcategories. Thus, 410 in BSP 751-410-101 is the number used to identify a subcategory dealing with abbreviation listings within the Common Language division. The final three digits of a BSP are referred to as key numbers. They point to a particular BSP within a subcategory. In BSP 751-410-101, 101 is the key number for the BSP entitled, "Standard Abbreviations Master List — Words and Their Abbreviations."

BSPs may be ordered from Western Electric's Information Distribution Center on a standing order basis by distribution code, or they may be ordered on a one-time order basis.

BSP Standing Orders

Standing orders authorize the automatic distribution of stipulated quantities of all new or reissued BSPs or BSP addenda. They are shipped to their designated locations as AT&T releases them. Normally, new or revised BSPs are distributed no later then eight weeks after printer's negatives are received.

A BSP standing order may be established for an entire Bell Operating Company or for each area within that company. Appropriate accounting is assigned to each standing order, and each order provides that all billing against it be rendered to one point in the Bell Operating Company or area. The Information Distribution Center also renders a bill against the standing order for each distribution regardless of the number of "ship to" addresses involved. This bill shows the standing order requisition number, operating company appropriate accounting, total number of locations, total number of pages sent, price, and date billed. The bill does not contain any reference to the shipping addresses.

The Coded Distribution Order Processing and Billing System is used to process standing order BSPs. This coded system uses the 9-digit BSP number to process all BSP standing orders structured by distribution code. However, subject-matter experts in each Bell Operating Company determine their company's appropriate internal codes for assigning those standing order BSPs to a particular subject and task, system, or function. An end-user in an operating company who requested standing order distribution of a BSP, therefore, would be coded to receive that BSP, any updates, and any other standing order BSP assigned to the same internal code by the subject-matter expert.

For every operating company, the Coded Distribution Order Processing and Billing System has two master files: the Header file and the Operating Company Master Index Tape file (OPMIT). The OPMIT file relates individual 9-digit BSP numbers to their respective distribution codes. The Header file contains information relative to quantities, shipping addresses, and billing information. As AT&T formally releases new or revised issues of BSPs, release data is input and the system:

1. Locates affected individual BSP numbers in the OPMIT
2. Extracts associated affected distribution codes from the OPMIT
3. Locates affected distribution codes under the associated operating company in the Header file
4. Extracts the quantity, shipping location, and billing data from the Header file
5. Generates necessary select tickets and billing.

BSP One-Time Orders

One-time orders are used when it is necessary to order individual practices or groups of practices for some one-time purpose. Examples of when one-time orders are needed include ordering bulk shipments for redistribution from a local distribution center, establishing a file for a new location about to be placed on standing orders, or replacing missing or damaged file copies. On these orders, the 9-digit BSP number may be used to obtain either individual BSPs or groups of BSPs.

A Customer Order System processes one-time orders. Merge Code Orders and Regular Orders are the two ways for inputting a request into the system. With Merge Code Orders, a distribution code, or codes, is input and processed against the OPMIT files of the system to examine requirements and generate a detailed order of individual BSP numbers. With Regular Orders, individual BSP requirements are input and processed, generating a detailed order or individual BSP numbers.

In both cases, the order is mechanically translated to an individual 9-digit BSP number and input. The system then generates a select ticket to effect shipment. (The advertised shipping interval for one-time customer orders is 10 days from receipt of order.) Upon acknowledgement of shipment, the system also generates billing records that interface with the Consolidated Billing and Crediting system each week.

ELECTRONIC INFORMATION DISTRIBUTION — A LOOK AT TOMORROW

The physical distribution of BSPs and other paper documents takes excessive amounts of time, requires high transportation costs, relies on typesetting and printing operations that cause traditional delays, and represents a large warehousing and finished inventory expense. In addition, as the Bell System continues to reorganize and as it accelerates the introduction of new technology into its operations, the mechanized paper mill that has served to date will have to be updated to meet the needs of the information age. Although the demand for certain types of information on paper, microfiche, and microfilm will continue, in the future, most information will be transferred electronically. We have defined our requirements for an electronic system, and are looking at what various vendors have to offer.

The electronic distribution of information probably will be achieved through the use of a single-source, direct-access data base that can interface with existing data bases. Such a system will avoid the time delays and customer confusion associated with the present multiple-source, paper-distribution method. All information in the data base will be stored in a format-independent form to allow input from a variety of sources and output in a variety of formats. Further, in contrast to the present system, which prohibits customers from ordering earlier issues of a document to support older versions of equipment, the data base will maintain all issues of a document. This electronic storage of information will eliminate the large inventories of printed documents and back orders now existing. However, to accommodate the volume of information that will be electronically stored, the data base may grow as large as twenty gigabytes.

An interactive, user-friendly access system will permit customers to search for and retrieve information directly through their terminals. It will take minutes rather than weeks to obtain information. For example, standing orders take eight weeks to distribute after the receipt of negatives at a printer. In comparison, electronic mail can have those same standing orders distributed within minutes once a technical writer has updated the source data base. In addition, the information will be more up-to-date than is possible in the current paper distribution system. At present, users of BSPs get those documents only after they are in their final, formatted form, but with a data base capable of accepting documents in preliminary, unformatted stages, users of BSPs could find out about new developments months sooner than is now possible. For example, the automatic distribution of electronic mail messages might be used to alert potential users of a preliminary BSP as soon as it was entered into the data base.

Besides the advantage of a faster BSP distribution, a central data base for the electronic storage of information will also give users the capability to customize BSPs to suit the physical environment, available equipment, and craft procedures peculiar to each Bell Operating Company. Today, the Bell Operating Companies routinely review new BSPs and BSP addenda to determine the economic impact of those documents and to ensure their compatibility with the technology used in the individual operating company networks. Often, the operating companies have to spend a good deal of time and effort rewriting and rekeyboarding BSPs and BSP addenda to fit specific purposes. In contrast, an electronic storage system that allows BSPs to be tailored to the needs of the operating companies will eliminate this duplication of production work.

Compared to today's multiple-source, time- and labor-intensive paper-based distribution system, electronic distribution will offer significant improvements. It will give the Bell System a far more cost-effective way for accessing the most current user-oriented information available. Storing BSPs in a central data base will permit the Bell Operating Companies to obtain BSPs faster, to customize official issues of BSPs more easily, and to create their own documentation such as job aids and user manuals from those BSPs without incurring excessive production costs. In the future, the benefits of electronic information distribution will be instrumental in keeping the Bell System the world's best telecommunication network.

MICROPROCESSORS AND TECHNICAL WRITING
(Paperless Documentation and the Friendlier User Interface)

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ABSTRACT

The paper deals with the impact of the microprocessor on traditional technical writing roles. Four principal trends can be identified in current microprocessor technology and marketing. These are:

- Pervasiveness
- Data Processing/Word Processing convergence
- Hardware/Software divergence
- Documentation/User Interface convergence.

Taken together, these trends suggest that most technical documentation will soon be produced, distributed and accessed electronically. This kind of vertical monopoly has been dubbed "electronic documentation."

Electronic documentation (ED) is distinct from technologies such as electronic publication, in which only parts of the total process are electronic (although particular stages such as keying-in, editing and typesetting may be handled entirely by electronic means).

INTRODUCTION

The continuing proliferation and market penetration of microcomputers and word processors is a fact of life. Word processor growth currently averages 30-40% annually. The Canadian Information Processing Society projects a Canadian growth from 84,000 personal computers in 1981 to 690,000 in 1990. A Financial Post article (Financial Post Report on Business Communications, 1982) predicts 100,000 desk-top computers and 36,000 word processors installed by 1985. The six-year growth figures for these two areas are 2,100% and 1,500% respectively. More conservatively, Evans Research Corp. forecasts that WP will reach 53% annual growth in 1987, and that the personal computer market will average 77% growth to 1987 (The Electronic Office in Canada, Minister of Supply and Services, May 1982). Similar growth rates should hold true in both the U.S. and the European Economic Community.

Technological Developments:

While many of these microprocessor-based devices (micro- or "personal" computers and word processing installations) have restricted capabilities, technology is rapidly eroding the constraints. Large scale integration (LSI) is decreasing microprocessor component cost and size while increasing processing power. In the critical areas of operational speed and fast memory, micros under $10k now exist with functionality formerly available only on mini-computers costing many times more. Sixteen-bit logic is also widely available, and Intel, National Semiconductor, Bell Labs and Hewlett-Packard are now producing 32-bit chips (The Economist, July 1985, p.80.) In Japan, Nippon Telephone & Telegraph and NEC-Toshiba have produced 256k RAM memory chips. Nor is this list by any means exhaustive.

Technical Writing:

These developments will inevitably affect the technical communications field. Some consequences are already apparent, as the popularity of Word Processor and Electronic Publishing sessions at the 29th ITCC shows.

MAJOR TRENDS

As professionals, we should now be investigating trends in the microprocessor industry in order to determine what necessary changes and opportunities these imply for technical communicators. There appear to be four principal trends at work concurrently:

Pervasiveness: Every indicator suggests that microprocessors will achieve a market penetration comparable to that of television.

DP/WP Convergence: Electronic Data Processing (EDP) and Word Processing (WP) were formerly quite distinct, but increasing hardware capabilities and demand for multifunctionality have led to growing cross-fertilization.

Hardware/Software Divergence: Hardware and Software products are resolving into separate market components.

Documentation/User Interface Convergence: The progressive merging of user documentation and the microprocessor "user interface." User interface is a vague way of describing the possible kinds of interaction between a piece of equipment and its operator. As more and more equipment acquires microprocessor controls, the opportunity to make the user documentation part of the equipment is expanding steadily. In effect, the documentation becomes an aspect of the user interface.

These trends are discussed on the following pages. Together, they imply radical changes throughout the technical documentation field.

PERVASIVENESS

The facts speak for themselves. In addition to the growth rates described above, softer evidence in the form of usage patterns and stated institutional goals suggests that anticipated growth rates may actually be conservative. For example:

- The target figure for most school systems is one terminal for every 10 students.
- Cable companies are already offering computer hookup services to their T.V. customers.
- There are now established networks of communicating personal computer users.

DP/WP CONVERGENCE

The Economist reported in 1981 that:

> The new technology is causing a subtle convergence of quite separate developments. Products coming to the market from different corners of industry (video disks, teletext, personal computers, picture processors...and, of course, word processors) share many of the same components. During the 1980s, a number of these applications will merge into a single product, offering the user freedom to perform a wide range of tasks at work or in the home (The Economist, July 25, 1981. p. 80).

Particular examples and aspects of this trend are:

1) Text editing on Microprocessors

Text-editing programs such as SCRIPSIT II and WORDSTAR are much friendlier than their remote ancestors of the seventies. Some new text editing programs such as Future's FOR:WORD are almost indistinguishable from the standard WP offered by the larger dedicated WP firms. (Not entirely surprising, since the WP manufacturer may be involved in the microprocessor software development scheme.)

Conversely, WP firms are offering:

2) More sophisticated macros

These very-high level languages were developed to allow operators to represent keys as words. For example, the screen key would be typed S+C+R+E+E+N, the move key as MOVE, etc. Over the past three to five years, however, additional control structures have been added which resemble such BASIC or PASCAL commands as FOR...NEXT, WHILE...WEND, GOTO, GOSUB, IF...THEN etc. These are usually called Decision Processing or User Programming features, and are being steadily enhanced.

3) Data Processing on WP systems:

Microprocessor logic chips such as the Intel 8080/8085, Motorola MC6800, Zilog Z80/Z80A etc. used in microcomputers are usually the same as those used for dedicated WP systems. It is frequently possible to 1) reboot (that is, change the operating programming) from WP to a DP Operating system (OS) supporting an interpreter or compiler; or 2) to run a phantom DP OS on a subsystem with the same effect, or 3) to rewrite part of a compiler to match the existing OS. The net effect is that BASIC is increasingly available as an option on WP systems, along with the attendant Assembler functions. Other languages are inevitable. (See Business Report, September 1982, pp. 31-32.)

4) Communications

WP/DP convergence is also evident in the increased popularity of communications interfaces. The Canadian Financial Post projected a seven-year growth figure of 1500% for communicating word processors. Much of this communication is with mainframes and mini-computers like the PDP-11 for purposes of database maintenance, distribution, and (a small but rapidly-growing minority) program development.

HARDWARE/SOFTWARE DIVERGENCE

Hardware and Software products appear to be resolving into separate market components. Symptomatic of this development are: 1) OEM arrangements in which a hardware manufacturer sells a microprocessor or component to a firm which will load the system with its own proprietary software. 2) Software houses like the aptly-named Lifeboat group in New York, which sell applications packages for use on standard OSs such as CP/M.

This trend is primarily associated with the microprocessor market, where standardized software can be widely retailed. Management Science America (MSA) anticipates annual growth up to 100% in its micro division, Peachtree Software. By comparison, mainframe software writing is usually custom-built, unsuitable for general marketing.

Implications for Technical Communications:

From the above we can infer that there will be 1) an increased demand for user documentation and service (technical) documentation about all aspects of the microprocessor business, including communications and peripherals, and 2) A dramatically increased opportunity to provide documentation in a non-print, electronic format. In other words, Electronic Documentation has arrived and can be expected to become a major feature of the technical writing landscape.

Definition of Electronic Documentation:

Electronic Documentation (ED) is any information which supports a product or service and which is made available as on-line, off-line or communicated electronic data.

Electronic Documentation can take forms ranging from passive page-like presentations to fully interactive programs. It may be supplied as:

- "frames" or pages of text and/or graphics, presented on-screen similarly to fiche or conventional paper documents.
- function-associated files, invoked during use of particular software packages and operations (e.g. Help files), tailored to particular system architectures.
- executable interactive programs with or without accompanying paper documentation (e.g. traditional Computer-Aided Instruction (C.A.I.) modified for microprocessor operation).

Help Files:

For writers supplying the microprocessor hardware and software industries and their users, one immediate ED possibility is the help file system. Help files can be written like a reference manual, subject to graphic and screen size limitations. Each screenload becomes a 'page'. The end user calls up the files on screen by typing in a command related to the command about which information is required. More dynamic forms of the help file system call up groups of related data depending on what application-specific keys are typed. This is characteristic of Wordstarand the Supercalc family, for example.

Examples of Help:

The traditional IBM system provides information when you type in HELP plus the function name with no subsequent "parameters" or specifics. For example, HELP ALLOC would provide information on the syntax and parameters for the file ALLOCation function. Another system might allow users to simply type a question mark after the command about which they need information, for example, FILE RENAME?

Technical Writers and C.A.I.:

Until recently it would have sounded like science fiction to suggest that more than a few technical writers would soon program effectively enough to develop interactive instructional material. The availability of very-high level languages (and to some extent authoring programs) makes this increasingly probable. Greater computer literacy is required, but the proliferation of personal computers suggests that the ability is already becoming available. The many attractions of ED are also likely to figure prominently:

- Decreased production costs,
- shorter lead times,
- better error checking,
- better user response and
- faster equipment training/retraining

are all important factors for both writers and customers.

DOCUMENTATION/USER INTERFACE CONVERGENCE

This form of ED demonstrates another major trend: the progressive merging of user documentation and "user interface." User interface is a vague way of describing the possible kinds of interaction between a piece of equipment and its operator. As more and more equipment acquires microprocessor controls the opportunity to make the user documentation part of the equipment is expanding steadily. In effect, the documentation becomes an aspect of the user interface. (See, for example, "The Marriage of Information and Computer Function", R.A. Ward, STC Proceedings, 1982, p. C-99.) From a design standpoint, the ideal user interface is one that explains itself, and avoids the necessity for costly training and user documentation. An effective help file system is a major step towards this goal.

Applications:

The area of major impact will be documentation for software packages. ED is particularly suited to this field because the volatile software business allows writers little lead time in which to prepare documentation between product development and launch. A fringe benefit is that the documentation and programming can be delivered and used as one integrated, cost-efficient package. As an indication of the size of this market, the most recent McGraw-Hill Data Book Directory of Microcomputer Software has more than 16,000 listings.

Computer-Aided Instruction:

Computer-Aided Instruction (CAI) is not a new concept. Control Data introduced the PLATO system in 1962, for example. In the past, however, it has been geared to mainframe capacity and capabilities. Training documentation oriented to microprocessor CAI is a new but lucrative field, so far largely restricted to the formal education market and sophisticated simulators. However, a Training/HRD survey showed that:

> more than 20% of our readers/respondents indicate that they use computers as training aids...and over 60% who do not currently use computers forsee using them within the next five years.

(Training/HRD, April 1982, p.18)

Possible Applications of Electronic Documentation

1) The Aerospace Industry

Training ED can be expected to range from pure teaching with no technical involvement, to a variety of structured reference-like applications, or procedures. In the aircraft industry, for example, the only obstacle to complete replacement of the fiche system is inadequate graphic capabilities on most cheap terminals. The obstacle appears to be temporary. Xerox has already introduced a relatively inexpensive (relative to Very Expensive) system with a bit-mapped display that allows almost any graphic element to be shown.

Maintenance or Structural repair manuals could be developed on-screen, validated, approved and distributed with no intervening delays for typing, printing, physical distribution etc.

Mainframe database systems for aircraft maintenance already exist. The cheap, portable microcomputer now makes it possible to distribute that information by phone, virtually anywhere. Certainly the reverse direction has been tested effectively: one Economist correspondent used an Osborne 1 with an accoustic coupler to send in despatches from Afghanistan.

2) Training documentation
The major immediate strength of C.A.I. is that it lends itself so well to any training program focussing on activities, on specific skills that have to be put into practice. Specifically, the modular and behavioural orientation of Mager's Criterion Referenced Instruction or 'Mastery Learning' is ideally suited to the computer's ability to simulate situations requiring a specific set of responses. Similarly, the screen-load of information can easily be broken into maps and block labels for Information-mapped presentation. This particular combination of elements is unusual in a microprocessor environment at the moment, but it is currently in prototype testing at AES Data, and should also appear shortly in some form at Apple.

3) Technical documentation
Similar uses for technical CAI are practically unlimited. The point is that just as technical communication can make the equipment interface friendlier, so the microprocessor can make the documentation interface friendlier and more cost-effective.

Related Businesses:

In addition to changing technical writing roles, industry trends are likely to create a demand for professional counselling in several areas, particularly acquisition and installation counselling. These services already exist for mainframe computers, of course, but few people seem to know how best to thread the maze of microprocessor/WP software packages and compatibility problems to find the ideal program for a specific business.

CONCLUSIONS

The possible conclusions are numerous, but from the technical communicator's point of view, the most important are obvious:

1) Rapid and far-reaching changes in documentation production and distribution are imminent.

2) It will be increasingly desirable for technical writers to have some level of computer literacy.

3) The most probable development will be Electronic Documentation, in which the entire documentation process happens without benefit of paper.

In fact, this is no longer a prediction. A number of firms, including AES Data, are already implementing some form of ED. A significant fraction of the thousands of software packages available for personal computer use would probably also fall into this category.

THE AUTOMATED SYSTEMS APPROACH TO PROPOSAL PRODUCTION: THE PROPOSAL TEAM

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ABSTRACT

This Automated Systems Approach to Proposal Production incorporates a dedicated proposal team, an established data base, a network of technology, and a process that carries the proposal through five phases from studying the RFP to delivering the bound volumes. We include in this paper an overview of the systems approach to provide reference for the functions of various proposal team roles. The team roles are defined in terms of responsibilities and authorities, and the team structure is designed for maximum efficiency and productivity.

INTRODUCTION

For professionals in technical communications, few activities are more demanding than those involved with producing high-quality, competitive proposals under deadlines. At Physical Science Laboratory in New Mexico, we have developed an Automated Systems Approach to Proposal Production that is designed to relieve a significant amount of proposal-crunch stress for writers, editors, managers, and support groups working to meet deadlines, and to help assure higher standards for the products of their efforts.

Four papers in this stem describe four aspects of our approach to proposal production. In this paper, the first of the series, we present an overview of our systems approach and discuss the staffing considerations for the proposal team. In the next three papers, Susan Bagby describes the technology, Sherry Dell describes the data base, and Jim Euler describes the process.

OVERVIEW OF THE SYSTEMS APPROACH

Before the days of computers and word processors, proposal teams started from day 1 organizing and writing all text for a proposal. Electronic text managing equipment has made the work much easier, providing the capability for major revision and text manipulation without the agonies of cut/paste/re-key procedures. To exploit these capabilities further, our systems approach establishes an expansive data base with electronic "boilerplate" that can almost immediately provide essential blocks of text for most proposals.

Our systems approach also incorporates strategies for early generation of that critical first draft of the technical approach to the proposed project. To give management the information needed for a bid/no-bid decision, the technical staff uses view graphs and other visuals in a presentation on the technical approach to the proposed project. We video- or audiotape these presentations, then transcribe and edit them to produce a first draft with related graphics.

Central to the systems approach is an effective proposal team with specified roles, dedicated to a systemized method of using the information and the equipment to carry a proposal through five phases of development from studying the RFP to delivering the proposal. Because each aspect of the systems approach is based on principles, rather than prescriptions, the approach remains flexible enough to accommodate a variety proposals addressing projects in a variety of fields. In smaller or more routine proposals, for example, one team member may take on the responsibilities and authorities of more than one team role, and some of the tasks in the process may be combined. In mammoth proposals, on the other hand, several individuals may be needed to carry the responsibilities of a single team role, and tasks in the process may be broken into subtasks with check points and deadlines.

What seems especially important to us as publications professionals is that the basic ideas in our systems approach can be adapted to the needs of almost any proposal-generating group. While we do use a rather elaborate network of equipment, much of what we are describing here can be accomplished by a small group with a mag-card typewriter. (Note Bagby's paper, "The Technology.")

THE TEAM

Roles for the systems approach team are defined in terms of responsibilities and authorities. Six team roles are basic to our system: Proposal Manager, Text Coordinator, Writer, Contracts Officer, Text Processing Leader, and Graphics Leader. The way these roles are filled, however, may vary with the scope and complexity of a proposal. With a small proposal, for example, one individual may fill the roles of manager and writer and also may share the coordinator's duties with a technical editor. In major proposal efforts, the Proposal Manager may be assisted by a number of writers while the coordinator may delegate tasks to editorial assistants.

A significant advantage of the systems approach is that once the functions of these roles are established and all the proposal-generating groups within an organization become familiar with them, teaming arrangements become vastly more efficient. For example, individuals from various departments or divisions can be assigned roles on a proposal team for a project that requires expertise from more than one technical field. Because they are familiar with the team roles and the process, each is able to move effectively into an assigned role and to work cooperatively with others on the team. Fig. 1 depicts how the basic roles of the team are interrelated, and the following descriptions of the roles emphasize the interactions.

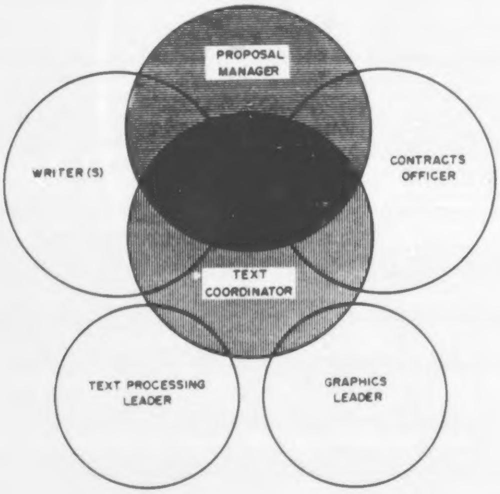

Fig. 1. The Proposal Team

PROPOSAL MANAGER

The highest authority and greatest responsibility for the proposal effort is carried by the Proposal Manager. In some cases, the individual who manages the proposal will also manage the proposed project. Because the PM functions as the primary author for the proposal, the person in this role must have an overall technical knowledge of the proposed project, as well as business management capabilities.

The Proposal Manager has responsibility for producing a proposal that establishes the reviewers' confidence that:

1. The bidders have a clear understanding of what is requested;
2. The bidders have the qualifications and experience to deliver what is requested; and,
3. The project proposed meets all requirements of the purchase description.

TEXT COORDINATOR

The Text Coordinator must be experienced in technical editing, and must ensure that the presentation of the proposal is thematically organized, that text is developed with appropriate visuals and is consistent in style and voice, and that work on the proposal progresses according to plan. The TC cooperates with the manager in establishing the content of the proposal presentation, and has joint responsibility for the form of the presentation.

The coordinator facilitates an "overnight" first draft of the technical approach by providing a fast substantive and format edit of the transcriptions from oral presentations the scientists and engineers make to management. (See Euler's paper, "The Process.") Since these presentations address the storyboarded topics assigned to each of the technical members of the team, audio- or videotapes of the presentations, along with copies of the graphics, can be transcribed and edited for that critical first draft of the technical approach.

Another responsibility for the coordinator is that of supervising the text processing and graphics personnel and facilities dedicated to the proposal effort. The coordinator works cooperatively with the Text Processing Supervisor and the Graphics Supervisor to assure that standard procedures are maintained and that personnel assigned to the proposal have everything they need to work efficiently.

The Proposal Manager and the Text Coordinator work closely with each other and with the writers. It is the manager and coordinator who outline the proposal, establish the storyboards, and make assignments to the writers. They also estimate personnel and facilities required for the production of the proposal and arrange for the dedication of those personnel and facilities.

WRITERS

The writers on the proposal team cooperate with the PM on matters of content and with the TC on matters of form. Some writers may be the scientists and engineers who are assigned to the proposed project. Others may be technical writers who produce text under the direction of the scientists and engineers.

The first efforts of the engineers and scientists are directed toward the oral presentation on the technical approach. We find that most technical people give rather well-detailed presentations without notes. They use their visuals as speech notes, and, by having those visuals in an appropriate order and by discussing each in terms of principles, functions, and effectiveness, they cover the main content of each storyboard. Most of their writing efforts then will be in revising and developing those edited transcriptions that are the first draft.

CONTRACTS OFFICER

The Contracts Officer works closely with the PM and TC on the Management and Costing volumes of a proposal, and is responsible for documents associated with the formal submission of a proposal.

TEXT PROCESSING LEADER

The Text Processing Leader for a proposal may be the supervisor of the text processing department, or may be a lead operator who is dedicated to this team role. The individual in this role assigns and tracks work flow and acts as assistant supervisor for other operators dedicated to the proposal.

The Text Processing Leader assists the TC with electronic management of boilerplate and with interface of boilerplate and new text, and assigns proofreaders to assist the coordinator with the final polishing of the text. This individual also provides current output (showing date and hour) during the revision process, and provides the TC with current status information on all text for the proposal.

GRAPHICS LEADER

The Graphics Leader assigns work, tracks work flow, and assures accurate rendition and fast turnaround for all art work in the proposal. This individual also assures that all work complies with MIL Standards when required, and that each graphic meets the criteria for the level specified for the job.

The Graphics Leader also advises the Proposal Manager, Text Coordinator, and writers on MIL Standards and on levels of precision for drafting.

CONCLUSION

A proposal team can interact more effectively when team members hold clear pictures not only of their personal roles but also of the roles to be filled by every other member. Effective interactions minimize internal conflicts which can erupt as crises for a proposal team.

We have matched our human resources to the proposal tasks with the objective of producing top quality proposals as quickly and efficiently as we can. Other organizations may establish proposal team roles with this same objective and yet may define roles differently. What is important is that the process is fast and that team members can work together effectively to produce a successful proposal. Furthermore, whatever team roles are established, those roles must be defined in terms of functions such as responsibilities and authorities, and all personnel who may be assigned a proposal team role must be briefed on those role definitions so that everyone understands what is expected from each member of the team.

THE AUTOMATED SYSTEMS APPROACH TO PROPOSAL PRODUCTION: THE TECHNOLOGY

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ABSTRACT

The equipment used to produce proposals at Physical Science Laboratory is diverse. It includes magnetic typewriters, word processors, computer terminals, output printers, and a phototypesetter. The equipment and the information stored on it are linked together by software and specialized hardware to form a flexible and smoothly operating system for producing proposals.

In producing proposals at Physical Science Laboratory (PSL) we use a collection of text processing equipment that mirrors the growth and development of the word processing industry. That is a euphemistic way of saying that not all of our equipment is exactly state-of-the-art. Like many other publications departments, we have purchased or leased equipment over the years as our needs have dictated and our budgets have allowed. Consequently, the most significant technological aspect of our proposal production system is not the equipment itself. Rather, it is the use of software and specialized hardware to create from our varied equipment an integrated and flexible text processing system. This paper describes how the individual units work alone, how they work together, and how we use them to produce proposals.

THE TECHNOLOGY

Most of our equipment has been leased or purchased from IBM. We entered the world of word processing with two Mag Card II typewriters. Then, we grew to include four Office System 6 Information Processors. Now we also have access to the main PSL computer (a 4341) via 25 terminals (Models 3270, 3277, and 3278). We can also use four kinds of printers (a 3287 low speed printer, a 3203 high speed printer, a 6670 laser printer, and two ink-jet printers).

In addition to our IBM units, equipment from two other vendors is important to our proposal process. We have access by telephone lines to a Compugraphic phototypesetter at another location on the New Mexico State University campus. We also have special hardware from Teleprocessing Products, Inc. that aids the communication between our various units.

We store information in three places: on magnetic cards, on diskettes, and in the main computer's on-line storage. Fig. 1 is a schematic of the overall system.

The Mag Card II Typewriters

Our Mag Card II typewriters can function in two ways: as standard typewriters or as devices for recording data permanently on magnetic cards. The latter use interests us here.

The magnetic cards used for information storage are approximately the same size as a computer punched card and can contain about as much information as a standard 8½"x11" typed page. In addition to storing text, the magnetic cards can store control characters that govern text formatting.

Information is stored on the magnetic cards in a format compatible with that of the Office System 6 (OS/6). Therefore, if an OS/6 is equipped with a magnetic card reader/recorder, information stored on magnetic cards can be easily accessed by and incorporated into the OS/6. In other words, we can combine information from the two sources without re-keying. The data storage compatibility also works in reverse: we can produce magnetic cards on the OS/6 that can be read by the Mag Card II.

The storage format on magnetic cards is also compatible with that of the 6670 laser printer. Information stored on the cards can be fed directly into the laser to be printed. Also, because the 6670 can transmit information as well as print it, information stored on magnetic cards can be sent by the laser printer directly to on-line computer storage.

The Office System 6 Information Processors

In addition to the four OS/6 information processors, or word processors, in our Publications Section, we have access to a fifth OS/6 within the Laboratory and nine others on the NMSU campus. The word processors consist of a small cathode-ray tube screen, a keyboard, a disk drive, and other optional devices. All four OS/6s in our section can read and record magnetic cards.

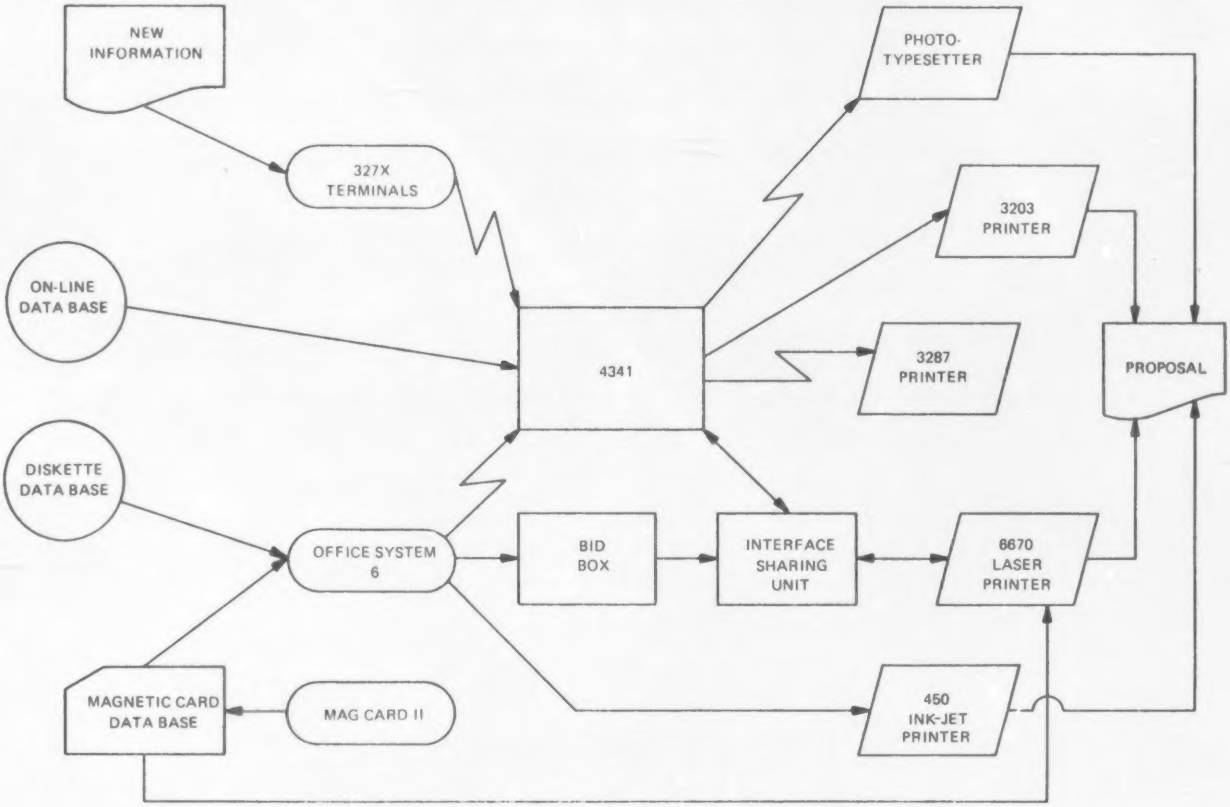

Fig. 1. Physical Science Laboratory's Proposal Production Equipment

The OS/6 stores information on diskettes about the size and shape of a 45 rpm record. One diskette can hold approximately 130 standard pages of information. Like magnetic cards, the diskettes can store both text and format information. In fact, most of the format information is added automatically when the operators depress certain keys on the keyboard.

Two of our OS/6s do not have printers of their own but the other two are equipped with dedicated ink-jet printers. These printers can print at a speed of 92 characters per second on non-continuous paper as small as 7"x7" or as large as 14½"x14". The ink-jet printers are programmed to print in three different fonts. These pages were produced by the ink-jet printer using a Prestige Pica font.

All four OS/6s can also use the laser printer as an output device. The OS/6s are tied to the laser printer by direct cable and specialized hardware from Teleprocessing Products, Inc. Each OS/6 is equipped with a special "bid box." When the OS/6 operators want to print information on the laser printer, they send a signal, or "bid," via the bid box to a bid receiver or "interface sharing unit," on the laser printer. The interface sharing unit opens the cable for information transfer from the bidding unit to the printer.

The fifth OS/6 at PSL and the nine OS/6s elsewhere on campus are linked by modem to the main computer at PSL. The modem, the crucial link in the proposal production hardware, allows transmission from the OS/6 to the main computer. Using the modem, we can transfer information stored on OS/6 diskettes or magnetic cards to the main computer's on-line storage, where it can be combined with other information in the computer's data bank. The modem allows us to combine information from three sources in one location without re-keying. Without the modem link, we would have to re-key at least part of our information to have it all in one location.

The Terminals

In addition to using the modem-equipped OS/6s and the laser printer as input devices to the main computer, we can also enter information into on-line storage via any of approximately 25 terminals linked to the main computer. Two terminals are located in the Publications Section and the rest are scattered throughout PSL. Through the terminals we have access to any of the output printers tied to the main computer and to the phototypesetter.

The Main Computer

The 4341 computer at PSL has 4 megabytes of storage and a large collection of control and peripheral units. Our proposal production application is only a very small part of the 4341's workload, which includes numerous scientific and business applications for the Laboratory and the surrounding community.

The Software

The 4341 operates using software developed by IBM and by PSL's data processing staff.

We use SCRIPT, a word processing software package, to manage the entry, formatting, manipulation, and retrieval of text. SCRIPT also automatically develops a table of contents, index, footnotes, and other text elements.

The Remote Spooling Control System (RSCS), an input/output interface program, is particularly important to our proposal process. Information originally stored on the OS/6 must be placed in on-line user files in a format compatible with the 4341. RSCS manages this transfer of information from one location to another. Unfortunately, RSCS can transfer only text successfully. Format characters which govern paragraphing, underlining, tabular conventions, headings, and the like, are lost in the translation and must be re-entered with SCRIPT commands.

We use the Document Composition Facility (DCF) software when we want to integrate the information stored in several on-line files.

The Output Devices

Four output devices are available to the main computer: the low speed printer, the high speed printer, the laser printer, and the Compugraphic phototypesetter.

The low speed printer operates at about 50 lines per minute. Obviously it is not fast but it has the advantage of being immediately available because it is dedicated to the terminals. For fast turnaround of proposal drafts, we use the low speed printer because our printouts aren't delayed in a long queue of users. Because it only prints in one uppercase font and it ignores some SCRIPT format controls, the low speed printer is adequate only for interim drafts.

The high speed printer produces much cleaner copy than the low speed printer. Its operating speed of 2000 lines per minute makes it the most popular printer at the Laboratory. In periods of extremely high use we must sometimes wait as long as a day to see our product, but usually we get our printouts in about an hour. We use the high speed printer in the later stages of a proposal effort when we want to check the document's format and paging.

The laser printer serves not only as an output device but also as a text processor, a communications terminal, and a copier. We use it largely for on-line communications and on-line and off-line printing. The laser prints 18 to 20 pages per minute in any of 45 available print fonts. Four of the fonts are permanently on-line in the machine and two more may be added, for a total of six fonts available at any time.

Unlike the low speed and high speed printers, the laser doesn't use continuous form paper. Each page is produced separately. Page sizes can range from 8½"x11" to 8½"x14".

As mentioned earlier, access to the laser printer is governed by the interface sharing unit which accepts "bids" from sending units throughout the overall PSL computer system. The exception to this is direct magnetic card input to the laser.

The Compugraphic phototypesetter is also available to print proposals that require very high volume or the demonstration of typesetting capability. We can send information from the 4341 or the OS/6 via modem to the Compugraphic.

APPLYING THE TECHNOLOGY

When we begin work on a proposal we do not have to start entirely from scratch. As Sherry Dell describes in her paper "The Automated Systems Approach to Proposal Production: The Data Base," also in these Proceedings, we have an extensive boilerplate data base that allows us to put many sections of the proposal in place within a short amount of time. We maintain some of the boilerplate on magnetic cards, some on diskettes, and some in on-line storage. The storage location we choose for a particular item of information depends upon its security classification as well as the nature of the information.

Assembling the Boilerplate

At the start of a proposal effort, the proposal team determines what parts of the boilerplate will be needed. We begin to gather that information into one central location. Depending upon the proposal's security classification, that location is either a diskette or on-line storage.

To begin a proposal on diskette, we copy the desired information from the boilerplate diskette and boilerplate magnetic cards to a new diskette. We reorder and reformat the information on the new diskette according to instructions from the proposal team.

To begin proposals in on-line storage, we take the process one step further and send information from diskettes and magnetic cards to on-line storage. To send information on diskettes, we use the modem-equipped OS/6. To send information on magnetic cards, we feed the cards directly into the laser printer. The laser, serving as a communications terminal, sends the information to the computer. RSCS handles the transfer of both kinds of information to on-line storage files, and DCF combines the boilerplate files in the required order.

Once the boilerplate is on-line, we access the information using the terminals. We edit the boilerplate with SCRIPT according to instructions from the proposal team. This initial editing also involves re-entering the format characters lost in the transfer to on-line storage.

Completing the Text

With the boilerplate in place, we are ready to enter the new information that the proposal writers generate. For proposals on diskette, we add new information to the proposal diskette using the OS/6. For proposals in on-line storage, we add new information using the terminals and SCRIPT.

Frequently, we use the printers to produce drafts of all the information that has been accumulated so that the members of the proposal team can be aware of their progress.

Printing The Final Copy

To get a final copy of a proposal, we send the entire text from diskette or on-line storage to the laser printer. Except for the graphic elements, the printed output from the laser is camera-ready. Once we have completed the copy with illustrations, we either Xerox it or print from the originals using the equipment in our Printing and Reproductions Shop. If we need many copies of the proposal, we use the remote phototypesetter instead of the laser. The Printing and Reproductions Shop handles the binding of the final copies.

SUMMARY

Our collection of equipment gives us all the standard advantages of word processing. We key in information only once. We can store information indefinitely and use it repeatedly. We can retrieve that information rapidly and manipulate it with ease. But it is the unique combination of specially designed hardware and cleverly used software—in short, applied technology—that elevates our collection of equipment to a smoothly functioning proposal production system.

THE AUTOMATED SYSTEMS APPROACH TO PROPOSAL PRODUCTION: THE DATA BASE

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ABSTRACT

Physical Science Laboratory maintains an electronic boilerplate data base specifically for use in proposal production. The data base contains five types of boilerplate files. They are: 1) General Capabilities, 2) Related Experience, 3) Resumes, 4) Management, and 5) Policies. The availability of the information stored in these files significantly reduces the work load at proposal production time, and allows more time for the the development of the technical volume of the proposal.

Here at the Physical Science Laboratory we have established an Automated Systems Approach to Proposal Production. This approach relies on an effective proposal team, modern technology, and an expansive data base along with an overall unifying process to produce quality proposals. The creation and maintenance of the data base is the subject of this paper.

ELECTRONIC BOILERPLATE

Traditionally, proposal teams had to start each proposal effort by gathering, organizing, and writing all of the text for an individual proposal. This effort could include searching out previous proposals for statements on general capabilities or descriptions of facilities, or it could include interviews with project leaders to get information on previous related experience within the organization. All of this effort was time-consuming and took time away from the development of the critical technical approach.

The development of the data base at PSL solves this problem. Through electronic "boilerplate" files we are able to store centrally up to 60% of the information needed for a standard proposal. We thereby reduce the workload at proposal production time and allow more time for the technical volume of the proposal.

Historically, "boilerplate" referred to those forms, tables, or charts that were printed in bulk prior to any proposal effort (or any publication effort), and then used by filling in the blanks according to the needs of that individual proposal. These forms saved time by eliminating the need for recreating each item at the last minute. Our electronic boilerplate is based on that same principle, and thanks to modern technology it saves us even more time.

We designed our electronic boilerplate files with three principles in mind. First, boilerplate information is keyed only once. Second, the information is permanently stored on some electronic medium. Third, the information is organized for easy manipulation. That is, a typist needs only to type the information one time and it is then permanently recorded on a diskette, magnetic card or computer memory bank for future use or revision. The information is filed so that it can be selected from a data menu, by topic or by paragraph, without further editing or proofing. It can also easily be rearranged, integrated with other text, or manipulated to fit any outline or format.

We have developed five basic boilerplate files that make up our data base at PSL. They provide information for 1) General Capabilities, 2) Related Experience, 3) Resumes, 4) Management, and 5) Policies.

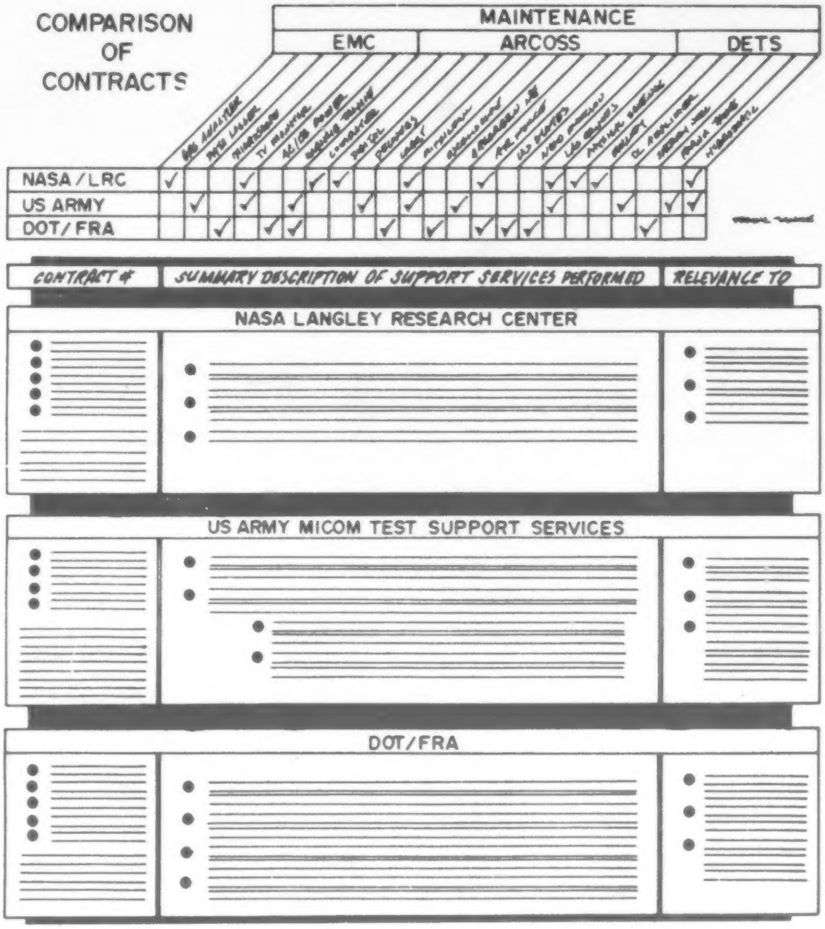
General Capabilities

Perhaps the most commonly used boilerplate files are those that provide General Capabilities Statements. These files are particularly useful for proposals because they can be completed in advance of the proposal effort. The proposal team needs only to output these files in order to be well on their way to proposal production. This text can provide a very positive psychological boost to the proposal team members; with a minimum of effort, they can see their proposal taking shape as early as the first day of work.

At PSL we have established our General Capabilities boilerplate by producing an overall capabilities brochure for the Laboratory and separate fact sheets for each division, section, and major project of the Laboratory. Fact sheets cover such areas as rocket telemetry, environmental assessment studies, electromagnetics and electro-optics. The text from the brochure and the fact sheets is stored in our electronic boilerplate files and then used frequently in proposals. The brochure itself has also been printed in color for distribution to prospective clients. The fact sheets, too, are printed so that they may accompany the brochure whenever a client is interested in more specific information about the Laboratory.

Related Experience

The information stored in the Related Experience boilerplate files is also of great importance to our proposal production. By gathering information on previous contract work from project managers and the contracts themselves, we are able to save the proposal team great amounts of time during the actual proposal production. We maintain both narrative summaries of previous contract work and shortened tables of pertinent contract information, such as name of contracting officer, length of contract, amount of contract, and type of contract. The modular nature of these summaries and tables makes them especially useful in the creation of comparison charts such as the one shown here in Fig. 1. These charts can be expanded to include any amount of information on any number of previous contracts, and are quite effective in demonstrating related experience. At the time of proposal production a writer can review previous related experience by printing out contract summaries according to her/his particular area of interest. S/he can then output final copy of those contract summaries that best support PSL's current proposed action. Of course these contract summaries must be constantly kept up to date. However, after the initial work of filing the contract summaries, the work of updating the files is quite minimal--thanks to modern equipment and technology.

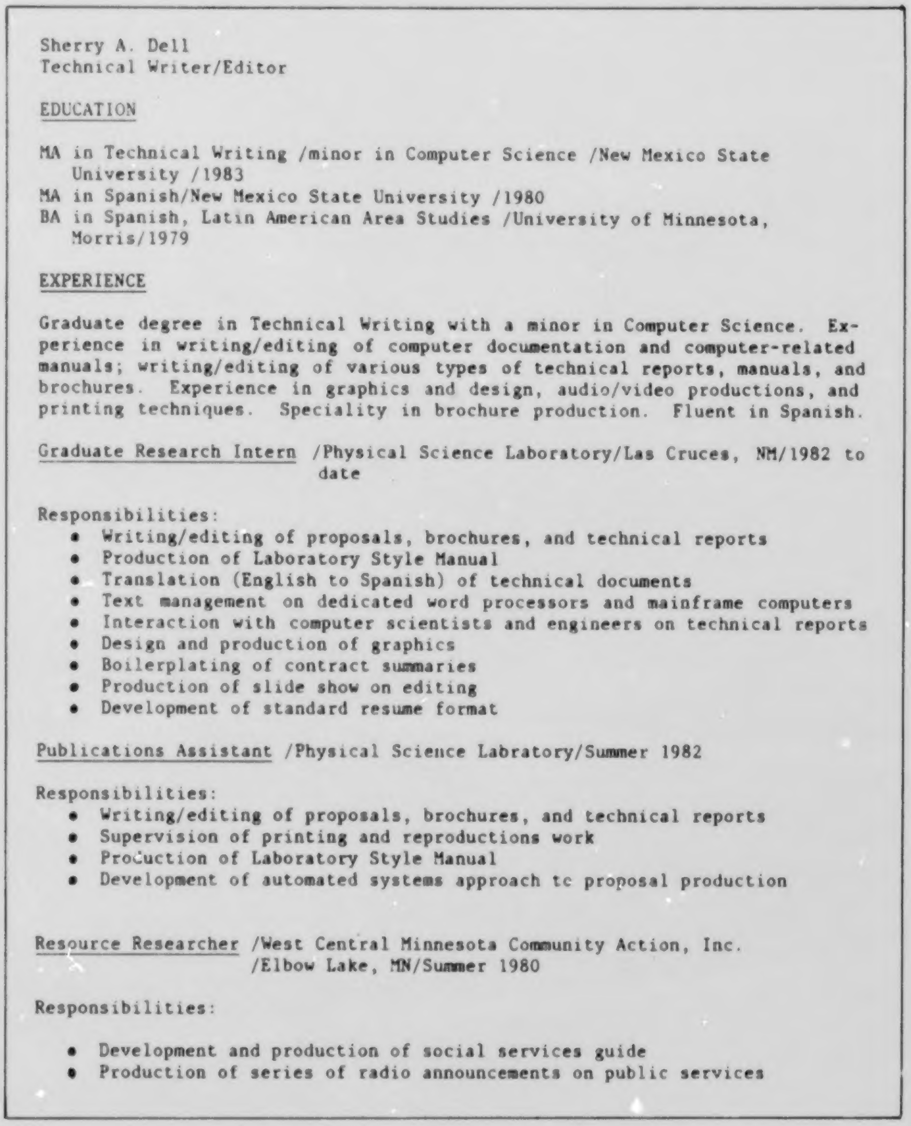

COMPARISON OF CONTRACTS
MAINTENANCE
EMC
ARCOSS
DETS
TV MONITOR
AC/DC POWER
NASA/LRC
US ARMY
DOT/FRA
CONTRACT #
SUMMARY DESCRIPTION OF SUPPORT SERVICES PERFORMED
RELEVANCE TO
NASA LANGLEY RESEARCH CENTER
US ARMY MICOM TEST SUPPORT SERVICES
DOT/FRA

BEST COPY AVAILABLE

Comparison of Contracts Model
Fig. 1

Resumes

Boilerplate files of resumes are another useful part of our data base. We maintain updated files of resumes for each staff member at PSL. These files save time when resumes are needed for proposals and also allow us the opportunity to establish consistency in resume format. We boilerplate both standardized long-and short-form resumes. The long form includes all work experience, presentations, publications, and memberships. The short form is a single-page format that includes a summary paragraph of the individual's experiences and then a listing of some specific job descriptions to support the summary paragraph. Figure 2 is a sample of the short-form resume we use at PSL. The short forms are very useful for proposals since the client is usually interested in general capabilities and not specific or detailed information. The narrative paragraph from the short-form resumes can also be used as supporting text for proposal sections on personnel qualifications. Also, our standardized short-form resumes provide all the necessary information for a human resources file, and they lend themselves well to sorting by selected descriptors such as current job title or past job titles.



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MA in Technical Writing /minor in Computer Science /New Mexico State University /1983
MA in Spanish/New Mexico State University /1980
BA in Spanish, Latin American Area Studies /University of Minnesota, Morris/1979

EXPERIENCE

Graduate degree in Technical Writing with a minor in Computer Science. Experience in writing/editing of computer documentation and computer-related manuals; writing/editing of various types of technical reports, manuals, and brochures. Experience in graphics and design, audio/video productions, and printing techniques. Speciality in brochure production. Fluent in Spanish.

Graduate Research Intern /Physical Science Laboratory/Las Cruces, NM/1982 to date

Responsibilities:

- Writing/editing of proposals, brochures, and technical reports
- Production of Laboratory Style Manual
- Translation (English to Spanish) of technical documents
- Text management on dedicated word processors and mainframe computers
- Interaction with computer scientists and engineers on technical reports
- Design and production of graphics
- Boilerplating of contract summaries
- Production of slide show on editing
- Development of standard resume format

Publications Assistant /Physical Science Labratory/Summer 1982

Responsibilities:

- Writing/editing of proposals, brochures, and technical reports
- Supervision of printing and reproductions work
- Production of Laboratory Style Manual
- Development of automated systems approach tc proposal production

Resource Researcher /West Central Minnesota Community Action, Inc.
/Elbow Lake, MN/Summer 1980

Responsibilities:

- Development and production of social services guide
- Production of series of radio announcements on public services

Short-form Resume Format

Fig. 2

Management

A growing number of government contracts have set requirements for how the contract is to be managed. The two most common systems follow Cost/Schedule Control Systems (C/SC^2) and Cost/Schedule Status Report (CSSR) guidelines. Using the principles behind these guidelines, a basic structure or outline for project management can be boilerplated, along with notes on implementing the structure.

Both C/SC^2 and CSSR depend on the Work Breakdown Structure concept (WBS), which dictates that any project be broken down from major component to minor component, through successively more detailed levels. This idea can be exploited to provide the management theory for contracts under C/SC^2 and CSSR guidelines. The decision can be made ahead of time as to what type of management will be enforced at each level of the WBS, and preliminary assignments can be made through generic titles. With this structure in place, when the RFP is received, particulars from the Purchase Description can be plugged in, along with the actual proposed personnel assignments to the predefined job titles. This effort creates a substantive first draft of the management section within a minimum amount of time.

Policies

Policy Statements, like all of our major documents at PSL are stored in boilerplate files. We boilerplate both short summaries and complete documents of all PSL, official policies. These are useful for proposals when particular organizational policies, such as travel policies or recruiting and hiring policies, must be included in some part of the text or in an appendix of the proposal.

SUMMARY

We have found that establishing and maintaining a data base of information commonly needed in proposal production is well worth the effort. Not only have we cut down the amount of time spent on repetitious efforts, but we also feel that we have found a way to encourage better quality proposals. Proposal teams are encouraged in their work early on by the large amount of the proposal that is completed nearly before they start. They have more time to work on the technical volume of the proposal. And in general, they have more time for the overall polishing of the proposal.

THE AUTOMATED SYSTEMS APPROACH TO PROPOSAL PRODUCTION: THE PROCESS

James S. Euler
Physical Science Laboratory

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Physical Science Laboratory
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M.A. in Technical Writing
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ABSTRACT

The process behind the Automated Systems Approach to Proposal Production pulls together the data base, the team members, and the electronic text processing equipment unique to the approach into an ordered, efficient procedure. The process consists of five distinct phases: Outline/Assign/Assemble; Draft; Coordinate; Edit; and, Proof.

Introduction

Simply because it was new, and simply because proposal writing is such a trying business, our initial presentations and discussions of our Automated Systems Approach were met with a good deal of healthy skepticism.

Despite what we felt were obvious advantages to our approach, implementing the procedure in place of familiar measures, however inefficient they were, was not easy. Particularly for a task as vital and as demanding as writing a proposal, people are wary of new procedures that might easily mean new problems. Given the already rigid constraints in proposal writing of deadline and content, the people we worked with were particularly concerned that our approach not impose more constraints, a concern we were eager to put to rest.

We gained initial support from several groups at the Laboratory by demonstrating that, contrary to making more work during the proposal process, our approach actually reduced the workload on proposal teams by accomplishing a substantial amount of the proposal work before the actual process began.

The process behind our Automated Systems Approach pulls together the data base, the team members, and the electronic text management equipment into an ordered, efficient procedure. Once the initial bid decision is made, the job is divided into five, clearly-defined phases, scheduled according to time available for the effort, and assignments made for each particular section. The five phases of the process are Outline/Assign/Assemble, Draft, Coordinate, Edit, and Proof (Fig. 1).

Bid/No-Bid Decision

Our basic principle of doing as much work as possible before the actual proposal process begins includes laying the groundwork for making the tenative bid/no-bid decision on the RFP. A standard set of bid/no-bid criteria, previously established according to particular management objectives, can make the decision process a more-or-less objective procedure. A tally of the "yes" and "no" answers to each criterion provides an objective guide to making the actual decision for any RFP.

Although a tenative "bid" decision has to be made to initiate the first phases of proposal production, the official decision in our Automated Systems Approach comes at the end of the second phase—the Draft phase. At that point, management has the advantage of a comprehensive view of the overall proposed effort, a respectable first draft of the technical approach, and a realistic cost estimate of the propoal itself. However, there is nothing about the systems approach to prohibit making a no-bid decision at any point in the proposal effort.

Outline/Assign/Assemble Phase

The first phase of the systems process—the Outline/Assign/Assemble phase—is one of the more demonstrably efficient parts of the process. In this phase the Proposal Manager and the Text Coordinator begin work to construct a general outline of the overall proposal, with detailed emphasis on the technical approach.

Almost all of the engineers we work with appreciate very much having an outline constructed early in the proposal effort as a guide to writing. Too often, the proposal remains a vague and undefined entity, looming in obscurity until the last days when, finally, someone begins to put words to paper and the thing begins to take shape. We avoid this by working from the start with an overall outline. For one particularly large proposal effort, we displayed the proposal outline, along with writing assignments, in a central command room. The net effect was to display to all concerned exactly where we were headed and how we were going to get there.

The management advantages to having writing responsibilities clearly spelled out and displayed are obvious. As an incentive to the authors, we track the progress of each author's section in a proposal from the first draft through all subsequent revisions. Any lagging behind is evident immediately, and the guilty author is tactfully prodded.

In constructing an outline for a proposal, we carefully consider and duly incorporate any information given in the RFP on evaluation factors and specific content requirements. Usually, the structure for the outline of the technical approach reflects the structure in the Purchase Description of the RFP, if applicable, so that the people evaluating the proposal can easily cross-reference particular requirements of the RFP with corresponding sections of the proposal.

The overall outline constructed by the PM and the TC is used in turn to develop thematic writing assignments for each author that include guidance and suggestions for appropriate visuals. A thesis statement for each topic, written by the PM and the TC, is also essential in focusing each writer and in assuring an overall consistency in the technical approach.

The technical ability of the PM is critical to developing both the outline and the subsequent writing assignments. Ideally, the Proposal Manager will be the same person proposed as the Project Manager for the contracted work, so that s/he will have the necessary technical background.

For extremely large or technically complex proposals, it is quite conceiveable that no one person will have all of the knowledge needed to develop thesis statements and general writing assignments for every section of the proposal. Even so, the principles of our systems approach still apply, and two or more persons could effectively fill the role of Proposal Manager.

Also in Phase I, the PM and TC establish two important deadlines: a delivery deadline—the last date that will still allow the proposal to be delivered on time—and a production deadline—a date one week before the delivery deadline. The early production deadline leaves time for final proofing and management approval of the finished proposal.

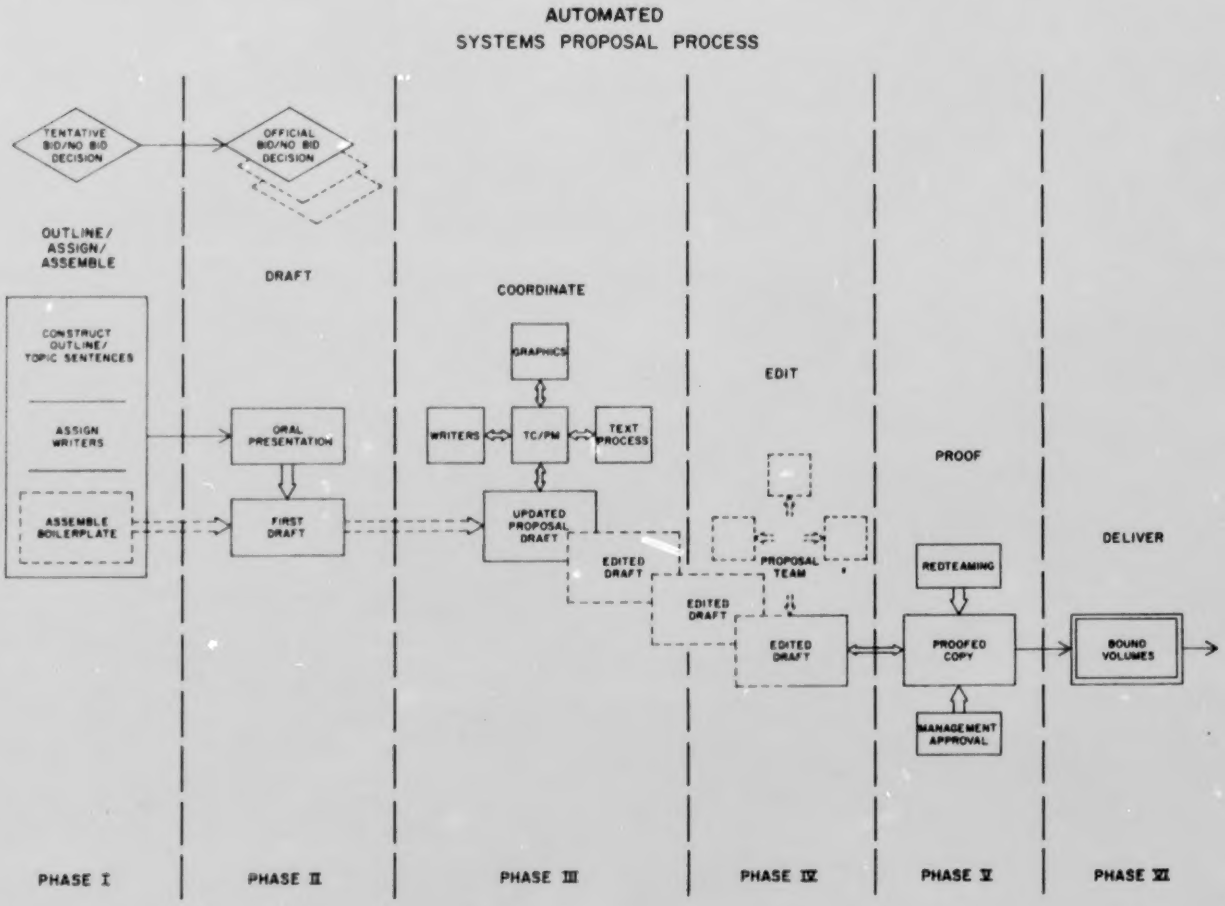
AUTOMATED
SYSTEMS PROPOSAL PROCESS
TENTATIVE BID/NO BID DECISION
OFFICIAL BID/NO BID DECISION
OUTLINE/ ASSIGN/ ASSEMBLE
CONSTRUCT OUTLINE/ TOPIC SENTENCES
ASSIGN WRITERS
ASSEMBLE BOILERPLATE
DRAFT
ORAL PRESENTATION
FIRST DRAFT
COORDINATE
GRAPHICS
WRITERS
TC/PM
TEXT PROCESS
UPDATED PROPOSAL DRAFT
EDITED DRAFT
EDIT
PROPOSAL TEAM
EDITED DRAFT
EDITED DRAFT
PROOF
REDTEAMING
PROOFED COPY
MANAGEMENT APPROVAL
DELIVER
BOUND VOLUMES
PHASE I
PHASE II
PHASE III
PHASE IV
PHASE V
PHASE VI

Fig. 1. The Process

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At the end of Phase I, the TC and the PM pull together the necessary boilerplate from electronic files to "flesh out" the proposal outline. Sections on previous contract experience and contractor capabilities and facilities can be almost 90% completed during this phase, and the basic structure for the management sections can be set in place. This efficiency in the first stage of the proposal effort frees the proposal team to focus on the technical approach with a comfortable (or at least acceptable) schedule for developing and refining the text.

Draft Phase

Probably the most difficult task in proposal production is getting that first draft of the technical approach set down in words on paper. No one, especially engineers, it seems, likes to write under pressure of a deadline. The goal of Phase II—the Draft phase—is to produce that first draft as quickly as possible. The strategy we developed for generating that first draft centers on an oral presentation of the technical approach by the project engineers to the project managers, scheduled early in the proposal effort. Typically, the proposal outline has been constructed prior to this presentation, and the technical staff works from the assignments and thesis statements generated by the PM and the TC in Phase I. But if schedules are particularly tight, the presentation and the work in Phase I can be done concurrently.

The presentation by the engineers is audio- or videotaped, transcribed by a text processing operator, and edited into a readable format. This transcription is effectively the first draft, and each section is returned to the appropriate author for revisions and development. Our engineers and scientists, and probably most people, find it easier and more efficient to revise and develop an existing, transcribed draft than to struggle to write those first words on paper.

Another advantage of the oral presentation scheme is that the clear and logical thought typical of most technical people seems to be more evident in a spoken presentation than it is in a written first draft. This may be because an oral presentation to a small group of their peers is a more natural medium for those people than a typewriter and paper.

In any proposal effort, the managment people making the final bid/no-bid decision need early information about the proposed technical approach. The oral presentation scheme gives management a view of the project to be proposed and, at the same time, provides an efficient and effective aid to the technical staff in generating a first draft of the technical approach.

After the draft of the technical approach has been printed out, it is put together with the boilerplate material gathered in Phase I, and the process moves on to Phase III—the Coordinate phase.

Coordinate Phase

The main activities in Phase III are tracking drafts through text processing and compiling the output in a continually-updated three-ring binder as a source of complete and current information on the proposal. The text processing capabilities outlined for the Automated Systems Approach provides the writers with quick turnaround on their drafts, while compiling the updated output allows everyone on the proposal team to guage the progress of the proposal writing. We find that many of our engineers use the binder as a reference to what others on the team are writing, which encourages more consistency among all of the writers. The compiled output also allows the PM to evaluate and refine the content and format of the proposal as it grows.

One of the key responsibilities for the TC in this phase is assuring that sufficient dedicated Text Processing staff are on hand to handle the volume of drafts and revisions produced. The TC has to know at all times what the current workload is on the Text Processing staff in order to provide accurate estimates on turnaround time to the authors.

By funneling all work through a single point—the Text Coordinator—better control of the overall work is maintained, and a smoother flow to the Text Processing staff is possible.

Editing Phase

In the fourth phase—the Editing phase—a procedure we call "real time" editing takes place, during which drafts from the authors are edited as they pass through Text Processing. The TC and the PM edit for major errors in content and syntax as the drafts are turned in to the Text Coordinator but before they are turned over to Text Processing. There, personnel trained in both text processing and copy editing correct typographical, grammatical, and spelling errors as the draft revisions are keyed in.

With "real time" editing, preliminary copy editing is completed nearly simultaneously with writing, an obvious time saver. But the procedure depends on the PM and the TC being given free rein to edit the proposal copy, with the PM acting in effect as the sole author for the proposal. This idea was particularly hard for some of our engineers to accept, but the delegation of sole responsibility for the content of the proposal to the PM is vital for an efficient process, and is generally preferable from a management standpoint also.

After a final, comprehensive copy edit by the Text Coordinator, the proposal process moves on to the Proofing phase—Phase IV.

Proofing Phase

In the Proofing phase, the proposal is first "red-teamed." That is, the proposal is read and evaluated by personnel not involved in the actual proposal writing but knowledgeable in the technical areas covered by the proposal. Red-teaming provides a critical fresh perspective in evaluating the technical content of the proposal and the effectiveness of its presentation.

After all recommendations are reviewed and revisions are made by the proposal team, we send the proposal to upper management for final approval before delivery. Once final approval is given, the proposal is output in final form, copied as necessary, and the resulting volumes bound and delivered.

Conclusion

The support of those few, early converts has gradually won us more widespread support for our Automated Systems Approach to Proposal Production at Physical Science Laboratory, and as we use the procedure more, we find more areas for refinement.

Change is never easy, but we feel that the efficiency and flexibility of our approach to proposal writing more than offset any intitial effort or risk in implementing it. We hope that other publications groups try it, like it, and find more ways to improve it.

Automating the Writing Process: A Case Study

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The workshop will describe some ways that computers and information data bases can be integrated into the communication process as a tool to serve communicators. Used properly, computerized data bases can serve as a tool for technical communicators--simplifying some steps of the communication process and enabling the communicators to produce better information packages to be delivered to their audiences. With a little planning, computers can be brought into the communication process as an aid and convenience, not as a burden that creates unnecessary work and anxiety for technical communicators.

This workshop continues and expands on the information presented in panel ATA 6a, "Computers and Communication: From Planning to Publishing."

In ever-increasing numbers, technical writing and communication groups find that they can use computers to make their jobs easier and at the same time provide higher quality information to their readers. This workshop will acquaint ITCC attendees with ways that computers can be used in a communications group to smooth and improve the flow of information.

Ready access to computers has become a fact of life for many communicators, and the extent to which they are willing or able to use these computers will, in large part, determine their effectiveness as communicators in today's high-technology environment. In this workshop we will look at the integration of the computer into a communication process from three viewpoints:

- Using Computers to Manage the Information Development Process
- Putting Computers to Work for Us
- Publishing Information with the Aid of Computers

When the computer is introduced into an existing communication process, it will, in fact, reshape that process, providing the communicator with added scope and capability, a means of communication only dreamed of a generation ago. A goal of this workshop is to offer suggestions on how the computer can be introduced without causing undue disruption to a working communication process.

To make best use of an online computer system, a communication organization must structure its computer files and grant access to these files in such a way that everyone in the organization has access to needed information. At the same time, care must be taken to ensure that unauthorized persons do not have access to sensitive information or the ability to modify or inadvertently destroy others' files.

In this workshop, we will examine ways that these goals have been achieved in one organization and examine ways that they can be met in other environments. During the course of the workshop, we will develop a case study of how a writing group can automate its process to improve both the flow of work and its end products. The case study will stress features of interest to the attendees, enabling them to use the methods and techniques of the workshop when they leave the ITCC and return to their jobs.

FIRST ANNUAL MEETING OF USERS OF INFORMATION-HANDLING EQUIPMENT

Panelists

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  on Computer and Technology
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  Word Processing Association

Following Stephanie Rosenbaum's session at the 29th ITCC on "Systems Compatibility: A Barrier to Applying Technology to Documentation," several members of Stephanie's audience expressed the opinion that it would be very helpful to them if some mechanism could be set up to give them access to the names, addresses, and phone numbers of other STC members who use or manage word processing, phototypesetting, and other types of computer-assisted information-handling and document-production equipment and information on the type of equipment with which each of these members is familiar. Stephanie said that she was willing to put together just such a list and then circulate it to everyone on it if those people present wishing to be included would provide her with the necessary information. Thus, STC's first Users' Group was born. (Stephanie has since put together just such a list and, with each updating, circulated it to the members of the Users' Group.)

In the interest of continuing the information interchange already begun between the members of this group, the 30th ITCC will include this session to give the members of this STC Users' Group and any other ITCC attendees who wished to attend a chance to get together in a relatively informal and unstructured setting to exchange equipment-related problems, solutions, successes, and failures so as to benefit from each others' experiences and the group's collective knowledge concerning computer-assisted document-production equipment, be it word processing equipment, phototypesetting equipment, or very sophisticated and complex information-handling systems.

The panelists listed above will be present at the session to help direct the discussion and to answer what questions they can. Bring your own problem and solutions and participate! If you want to join the STC Users' Group, this is the time to do it.

TODAY'S DISPLAYS IN THE CONFERENCE OF TOMORROW

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ABSTRACT

The display technology available today — either in consumer markets or in experimental laboratories — will significantly change the way people exchange ideas and information in the 1990s. People may talk to video screens or may observe events taking place in distant locations without leaving the conference room. Interpersonal contacts will be sharply reduced while the rate and quality of data exchanged rise sharply. The application of new display technologies for presenting data to technical and management audiences in a large corporation environment are discussed in this paper.

A significant amount of the working day in the life of a technical professional—particularly a manager—is spent in a conference room talking, listening, examining data, and exchanging ideas with other people. The content, purpose, and structure of these conferences vary considerably as a function of the type of business, the customer(s), and the specific company involved. This interchange, which has evolved over the years with the use of vugraphs, movies, recordings, and other aids, still relies on the presence of key members around the table. Advanced technology, including large-screen displays, computer-driven CRT displays, and holographic TV, may not only enhance presentations given at conferences but also may allow people to participate in meetings without being physically present.

This paper discusses the state of the art in large-screen video displays and how this technology can be applied to meetings of the future. Three types of meeting are described as typical of those that take place within the program management structure of many large businesses: program reviews, technical reviews, and staff meetings. Finally, the social and psychological effects of these applications are examined.

APPLICABLE NEW TECHNOLOGY

Much of today's new technology will help shape the conference of tomorrow. Videotape cassettes, high resolution TV cameras, sophisticated TV editing equipment, telephone and satellite links, fiber optics and cable TV will all no doubt affect tomorrow's meetings. Of particular significance is the potential change inherent in the large-screen video display.

Large-Screen TV

Today's technology will make "video wallpaper" part of the decor of the typical conference room. The dull, blurred image of the current 525-line enlarged TV picture will be replaced with the sharp, bright image of high-definition TV (HDTV). HDTV, already available in 35- to 50-inch TV sets in Japan, is based on scanning 1,125 horizontal lines of picture elements to create a picture. TV signals will probably reach the conference room via cable or fiber-optic links. Signals will also be received by rooftop antennas from satellites such as the six planned by Satellite Television Corporation, a COMSAT subsidiary (1,2).

COMSAT has established SBS (Satellite Business Systems), a partnership with Aetna Life & Casualty and IBM. SBS, which offers advanced integrated voice, data, and image communications services, began commercial service through its own satellite system in March 1981.

SBS's initial offering — Communications Network Service — is an integrated, all-digital, high-capacity, private-network service designed to meet the intra-company communications needs of organizations with widely dispersed facilities (2).

Present display developments include such approaches as modification of electron-beam scanning devices, advances in projection systems, and solid-state displays. RCA Laboratories in Princeton, N.J. is attempting to develop a flat-panel display based on modification of the electron-beam mechanism. Researchers have come up with a four-inch-thick color display that measures 50 inches on the diagonal. The display is made up of a number of modules side by side, and these are bombarded by three electron beams deflected at right angles to the screen. However, RCA estimates that the display could not be available as a consumer product much before 1990.

Other companies that are pursuing large displays include Bell Laboratories, Texas Instruments, NHK, Sharp, Burroughs, Lucitron and Westinghouse (3).

A very high resolution,three-dimensional television system was designed and fabricated by 3-D TV Systems, Inc. (North Hollywood, CA) for use in the remote manipulation of radioactive materials. The system includes a stereo TV camera and a stereoscopic display/control console; the viewer either can watch a direct broadcast or can videotape the program for viewing at a later time. The console is intended for individual viewing and projection for group viewing. Audio system controls that permit a change from 2-D to 3-D and are included. The television system operates at 1,023 TV scan lines, 32 MHz, thus providing a photographic quality to the stereoscopic image. This image also can be zoomed in 3-D. A very high resolution stereoscopic projection display is available for group viewing (3-D polarized glasses are worn by the viewer) (4).

CBS has proposed to the FCC that future satellites featuring direct broadcast to the home be used to transmit HDTV signals. The satellites would transmit in the 12- and 14-gigahertz frequency ranges directly to 1-meter antennas on residential roofs. The larger bandwidths of the broadcast signals would enable specially designed direct-view and projection-TV receivers to display high-resolution images.

Determining standards is the big roadblock to higher resolution signals from direct- broadcast satellites. Service to the home and industry could be initiated by 1990 if standards presently being considered are successfully met (5).

Holograms

Holograms present three-dimensional images without requiring the viewer to wear special glasses (see Figure 1). Holograms are superior to photographs not only because of their three-dimensional properties but because images stored on a hologram cannot be destroyed by obliterating part of the hologram due to scratches, tears, or cuts. Current technology allows the hologram to be viewed using ordinary white light (6).

Another display of the future is TV holography, which projects 3-D images that appear to move around in space. Advances are presently limited by the complexities of designing a TV transmitter and receiver that can handle the extremely large number of picture elements needed for 3-D resolution. As technology advances, however, solutions to these design problems will no doubt be found and TV holography should become a reality.

A new color holographic technique has been developed for recording and projecting onto a screen full-color two-dimensional images from thin monochrome film. Recorded with three-color laser light, the images are reconstructed using a non-laser, white light, illuminating beam from a conventional projection lamp. A simple, single-aperture, color-controlling spatial filter is incorporated into a standard motion picture or slide projector for decoding and projecting the color images. By simply adjusting the size and position of this spatial filter aperture, both the color saturation and the hue can be varied over a considerable range without loss of image quality (7).

Computer-driven CRT Displays

The interconnection of a digital computer with a cathode-ray tube (CRT) display allows the generation of synthetic images. The heart of this technique is a computer program that contains algorithms capable of generating pictures that cannot be readily distinguished from pictures of real scenes. The hardware and software for two-dimenstional graphics are easy to use and readily available. The complexity of three-dimensional graphics is a barrier to their widespread use.

The images that appear on a CRT display are generated from mathematical representations stored in the computer program. Color displays use a shadow-mask CRT such as used on a home TV set. Advances in microelectronics (e.g., VLSI) show promise for the implementation of a complex algorithm to draw realistic representations of three-dimensional scenes. Hidden-surface algorithms for producing shaded displays are already available (8).

ANATOMY OF A CONFERENCE

In order to see how this modern technology can be applied to business meetings, we need first to understand the structure of these meetings. In particular, the discussion of this paper focuses on program reviews, technical reviews, and staff meetings within a large corporation.

Program Reviews

The purpose of program reviews, which usually take place at regular intervals (e.g., three or four months) is to review the progress and current status of a contract (i.e., program). Usually more than 75 people attend these two- or three-day meetings, and the atmosphere is formal. Visual aids include vugraphs (color transparencies projected on to a large screen), 35-mm slides, motion pictures. Videotapes shown on 21-inch TV monitors, and large-screen projectors (such as the Advent 1100). Both technical and management data are presented at these reviews.

Smaller but more frequent reviews take place within a large corporation between successively higher levels of responsible management and selected program managers. These reviews, which usually last a day or two, are somewhat less formal than the customer-contractor reviews but their objectives are quite similar: to uncover and resolve problems that might adversely affect the program being reviewed.

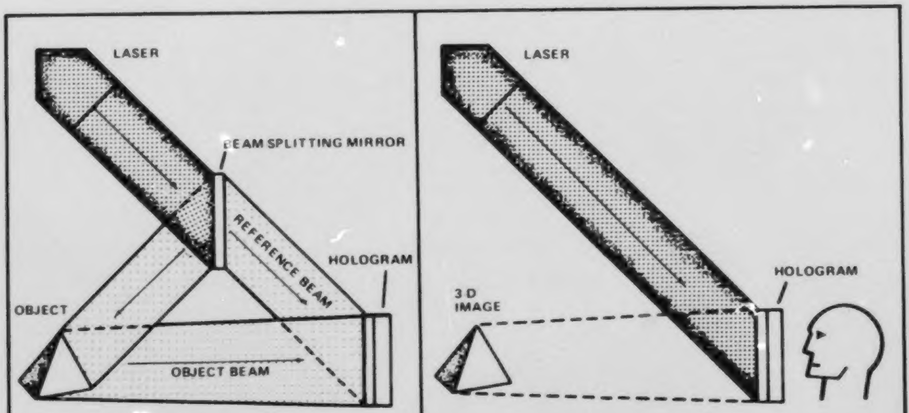

Figure 1. Creating a Holographic Image. *Light from a laser (left) strikes a half-silvered mirror, which splits the beam. Half of the light (reference beam) passes through the mirror and the other half reflects off the mirror, illuminating the object. The reference beam and the illuminating light then combine, resulting in an interference pattern that is recorded on film and forms the hologram. To view the 3-D holographic image (right), a laser illuminates the hologram (6).*

Program reviews — in particular the large-scale, customer-contractor type — usually require extensive travel by attendees. Logistics problems include providing hotel accommodations, food, and meeting facilities. Also, the data presented are not current because significant time is required to convert data to a visual form.

Technical Reviews

At these reviews, technical characteristics such as equipment (or system) performance, design approach, verification requirements, and test data are reviewed. A relatively small number of people attend these meetings (5 to 50) and the atmosphere is informal. Typical visual aids are blackboards, vugraphs, drawings, models, and computer printouts (numeric and plotted data).

Technical reviews are somewhat constrained by the practical limitations of data presentation. The availability of experts whose opinion may be of value is limited by travel considerations and scheduling difficulties.

Staff Meetings

Staff meetings are aimed at communicating information about the company from top management on down to all working levels, and vice-versa. It is probably the most inefficient of all meetings held in a large corporation. Information starts at the top and filters down to the bottom through numerous meetings at every level. Much time can be spent and information may be lost, garbled, and modified as it trickles down. The flow of information from the bottom upward can be even worse. Small groups of people may meet informally and the communication often is all verbal and few, if any, visuals are used.

The limitations of these meetings can be overcome with technology available today. As costs come down, this technology will have many applications.

APPLICATIONS OF DISPLAY TECHNOLOGY DURING CONFERENCES

The form and content of the conference of tomorrow will determine the technologies used. For program reviews and technical reviews, large-screen TV displays will very likely replace vugraphs, slides, and movies, enabling the information on the screen to be far more current than ever before possible. Audiences will be able to see near-real-time pictures transmitted to the conference room via satellite or cable. The typical far-flung operations of a large-scale military program will be seen by everyone in the conference room by depressing the right selection button on a console. Program managers can watch a missile being launched from a ship at sea or from an underground site in Utah. If real-time observation is not needed (or feasible), videotape recordings will allow playback of the event at the meeting. All significant events that took place during the review period will be recorded on videotape for viewing at the meeting. HDTV can provide large, high quality pictures to a relatively large audience.

Computer-driven CRT displays can find wide application in programs dealing with radar, aircraft, missiles, ships, or other data related to motion. The computer-graphic combination will be able to generate a complete video "movie" using recorded motion data on a computer tape input. In the case of radar data, the "movie" can reconstruct missile and radar (or many aircraft) trajectories in both two dimensions and three dimensions simultaneously. The display will show a missile engaging a target in real time, using CRT display symbols in any number of different colors.

Technical analyses of mechanical configurations or stress analyses of structures will be visible in great detail to a large group using holographic TV. The need for numerous complex mechanical drawings and artist's conceptions will no longer be required for a design review. Also, the use of colors will make difficult concepts easier to understand.

A major change in communications during conferences will come about when the displays become interactive. Thus a conference may comprise a limited number of people actually present and a number of TV images of people in various locations — all of whom can talk to one another. Holography may even put a three-dimensional "person" at the conference table (who wouldn't drink much coffee or smoke). Teleconferencing by phone is, of course, a reality today, but some people oppose its use due to psychological aspects.

Staff meetings also will begin to take on a new shape. The multiple meetings at all levels of an organization, from the top down, will be replaced with a single, top-level presentation that will be videotaped and shown to all levels of the organization on wide TV screens. Short question-and- answer sessions can follow the "show." Communications will then flow down with little distortion. Communication upward, however, will probably remain a social problem at all organizational levels.

PSYCHOLOGICAL AND SOCIAL CONSIDERATIONS

Most people like to communicate with other "real" people; TV images and holographic figures, to most, are not considered "flesh and blood." For instance, the effects of persuasion techniques over a telephone and during face-to-face contact are not the same. The admiral, general, or vice-president reviewing your program wants to see you but more importantly wants you to see him. So, the use of images will be limited to overcoming economic hardships, schedule conflicts, or similar situations that prevent attendance at a meeting.

Similarly, group interaction is most fruitful within a small group of one's peers and fellow workers. Ideas and candidness are generated in a friendly environment among people one knows and trusts. Hence, staff meeting will continue to take place but more time will be devoted to discussing the communication received from the videotape. It should be much more efficient and improve the employee-employer relationship.

Experimental evaluations of the psychological and social effects on teleconference participants have been conducted here in the United States and abroad. In a study conducted at the US Army Aeromedical Research Laboratory in Fort Rucker, Alabama, nine groups of 2, 3 and 4 students each (27 groups in all), discussed topics face-to-face or in one of two teleconference modes: teletype and televoice. Each group only used one of the three communication modes to solve a different problem on each of the three successive days. Each problem encouraged opinionated discussion and required the group to arrive at a consensus about certain topical issues. Equivalent solutions were reached in all communication modes, but subjects in face-to-face conferences used more messages and words than did subjects in either of the telecommunications modes. Communications rates were much higher and solutions were reached much faster in the two by means of face-to-face and televoice modes than in the teletype mode (9).

Experimental analyses were conducted by the Electronics Communications Laboratory in Tokyo, Japan, on participants in actual business meetings using a video conferencing system. When the participants later filled out a questionnaire, the experimenters found that video conferencing was evaluated by the subjects in terms of positive attributes: "communicative mood," "efficiency," "interest," and "stimulation." One-to-one video telephone conversations, on the other hand, were evaluated in terms of "discomposure" — a negative attribute. Questionnaire results also showed that most users can accomplish their objectives efficiently by means of the video conferencing system (10).

CONCLUSION

Video displays will never replace all of the people around a conference table, but they will replace a few of them. Conferences of the future will be more efficient and more productive.

A meeting to determine program status or progress will include up-to-the-minute viewing of major events taking place. Reviewers will see production lines in operation, tests in progress, and design concepts still on the drawing boards.

When combined with other advancing technologies — such as video cameras, optical fibers, and satellite and cable links — the wide-screen display and computer-driven CRT will make technical conferencing an exciting, productive event.

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WHEN WILL TECHNICAL WORD PROCESSING EQUIPMENT BECOME AS SOPHISTICATED AS THE TECHNICAL DOCUMENTS BEING PRODUCED?

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ABSTRACT

This paper presents an overview of equipment advancements that facilitate the creation, editing, and printing of technical documents. The paper focuses on the devices that will become commonly available within the next one to two years, and provides a glimpse of longer term trends.

Also highlighted are the special programming requirements necessary for developing technical documents on computer word processing equipment.

THE TONGUE-TIED COMPUTER

It's ironic, but very few computer word processors can be used to develop the technical documentation needed to describe the computer's own internal operations. The syndrome of the shoe maker's barefooted children has repercussions for all types of technical documentation. When I began writing my Ph.D. dissertation, I found no affordable word processing systems that would handle complex mathematical equations. Instead, I had to develop my own word processing system. To my surprise, I found the market for my technical word processing knowledge more lucrative than that for my degree (business economics).

TECHNICAL DOCUMENTATION

Technical documents are comprised of two different types of information: text and illustrations. Text information incorporates letters, numbers, and special symbols that are typed. Illustrations involve graphs, charts, and other types of drawings. Technical text requires advanced word processing capabilities. Illustrations involve much more complicated image processing.

Technical Text

Technical text (such as mathematical or chemical equations) requires not only its own set of special characters, but special character placement (super/sub scripting, overstrikes). Technical phrases and equations are usually intermixed with words. Thus, it is logical to enhance word processor programs to handle technical phrases.

Roughly 95 percent of all writing in the United States involves the basic English character set. Not surprisingly, very few word processors offer the many frills needed to handle the remaining five percent. The main problem is that fulfilling technical documentation requirements involves developing tens (if not hundreds) of special character sets.

Modern word processors are comprised of an editing terminal (keyboard and TV-like screen), a processor with memory devices, and a printer. The printer can most easily adapt to technical character sets. You need only substitute a different print element (assuming the printer you judiciously selected has such a character set available). Of course, the processor must send the correct codes to the printer in order to select the correct character from the special print element. For equations containing super or subscripts, the printer must also be capable of moving up or down less than one full line.

For ease of entry and editing, as well as for absolute accuracy, the editing screen should display the characters (in their shapes and placement) just as they will appear on paper. This requirement is vital. The equations are complicated enough without having the word processor impose another level of abstractness to the process. Most display screens display only a standard set of characters, and thus cannot display special technical characters. Virtually none can show super and subscripted placements.

Most word processors force the operator to mentally substitute technical characters for other characters that can be displayed on the screen. For example, the % symbol may be substituted for the integral sign ∫, ! substituted for β, ? for ∞, and # substituted for μ. Super and subscripts are usually coded in equally perverse ways, using special keys for entry and special symbols such as ↑ and ↓ to show special placement. Thus, the equation:

$$\beta = {}_0\int^{\infty} \mu dt$$

would be typed and cryptically displayed as:

| = ↓0↑%↑?↓#dt.

Clearly, this type of input and display is not at all conducive to efficiency and accuracy.

Displaying Characters -- Most terminals are programmed to display a fixed character set. Usually, this is the ASCII character set comprised of 96 printable characters (upper and lower case A-Z, digits, punctuation, and a few special characters). Some terminals allow alternate non-English character sets, typically substituting accented letters for some of the ASCII special characters. (For a discussion of foreign language word processing, see the paper The Necessities and Complexities of Multilingual Word Processing in this edition of the STC proceedings.) Most technical documentation involves highly specialized scientific characters that are not already programmed into computer terminals. Displaying these technical characters (such as ∞) requires a terminal whose character set can be defined by the operator. A few terminals allow an operator to program the terminal's character set by filling in a dot pattern on an enlarged grid on the screen. Characters are then defined in a matrix that is usually 8 dots wide and up to 12 dots high. Typically, up to 256 different character shapes of the operator's choosing can be displayed on the screen at any one time. These 256 shapes can be selected from a virtually unlimited dictionary of character shapes stored in memory.

Character Entry -- Special characters should be entered with a minimum of keystrokes. Computer keyboards allow operators to enter 96 different characters. To enter more unique characters involves one of two strategies. The most common (and most difficult) method forces the operator to instruct the computer to enter extended character mode (by pressing a special function key), type the special character, and then push another function key to allow entry of English text. Thus, three keystrokes may be needed for a special character.

The second strategy for entering special characters involves the concept behind the familiar shift key. The shift key allows one text key to serve two different characters (e.g., a and A). An additional shift key would allow up to four characters to be associated with one key. Most computer terminals have such a key -- it is usually labeled CONTROL. Newer keyboards, most notably the IBM Personal Computer, have a third shift-like key labeled ALTERNATE. Using these keys simplifies technical text entry. For example, b and B would be keyed in as usual, but β would be entered by holding down the CONTROL key while striking the b key. Similarly, number subscripts would be extensions of the number keys (e.g., H_2SO_4 would be typed as: H CONTROL-2 SO CONTROL-4). Using additional shift-like keys allows special characters to be logically associated with certain keys (Greek letters for their English equivalents, subscripted numbers for numbers), and eliminates the need for multiple keystrokes.

Typically, the screen representation of super/subscripted characters is usually depicted by special codes which make input and editing confusing and cumbersome. Newer display terminals have the capability to depict such special placements, but only a few word processing programs utilize this capability.

Though computer equipment can simplify input and allow display of technical symbols and special placement, these capabilites are of no use unless they are utilized by the word processor programs. Finding such a marriage of equipment and programs is sufficiently rare, prompting this author to develop and commercialize his own technical word processing system.

Typesetting

Much of the technical text is eventually typeset. The process usually involves drafting and editing the text on a conventional word processor, and then re-keying the text into a typesetting machine. Electronically linking the word processor to the typesetting machine would eliminate re-keying (and re-editing) the text. Unfortunately, the word processor's text formatting commands (indicating, for instance, text centering or highlighting) are radically different than those used by the typesetting machine. Special programming is needed to convert word processor files into a format that can be used directly by a typesetting machine.

An alternative to two-step word processing/typesetting is to deal directly with the typesetting machine from the beginning. For quick turnaround this assumes inhouse typesetting equipment (an expensive proposition currently). There are special programs that facilitate the entry of mathematical equations into typesetting machines. One example is the TROFF program available under the Bell Telephone UNIX operating system. Equations are typed in English and converted by the machine into the codes necessary to drive a typesetting machine. For example, entering:

sum from i=0 to infinity X sub i = pi over 2

would produce:

$$\sum_{i=0}^{\infty} X_i = \frac{\pi}{2} .$$

A similar approach, called T$_E$X (sic), has been developed by Donald E. Knuth. Both the UNIX and T$_E$X systems require mastery of an elaborate instruction repertoire. Neither allows the typist to see immediately on the screen exactly what will be produced on paper.

The increasing popularity of Bell Telephone's UNIX operating system for office systems will provide a standard interface between word processors and typesetting machines. However, inexpensive display screens that show the text in typeset form are just now being developed.

ILLUSTRATIONS

Technical documents usually encompass non-text illustrations. Currently, such documents are developed by creating the text on a word processor (leaving space for the illustrations) and then having the illustrations cut-in later. Extensive editing of the document necessitates yet another expensive and time-consuming trip to the graphic artist for a new paste-up.

The very latest document creation equipment can simultaneously display text and illustrations. These systems are just now holding their commercial debutant balls after coming out of the laboratories. Premiere among them are the Xerox Star work station and Apple's Lisa. Both allow the operator electronically to cut and paste documents, expand or reduce graphs and illustrations, and display text in multiple fonts. This new computer manipulation of illustrated material is bedeviled by a total lack of industry standardization. There are only a few terminals that can display illustrations with very high quality resolution.

The computer printing of illustrated documents remains an expensive proposition. The next year will see the commercial introduction of laser printers that produce pages with both text and illustrations. These high speed printers will allow inhouse text preparation for about the same price small Xerographic reproduction machines cost today. In fact, the laser printers operate in almost exactly the same fashion as the familiar Xerox machine. It's likely that the office copier of tomorrow will also double as a computer printer. It may also do triple duty by acting as a device to read printed illustrations into the computer (thus allowing hand drawings to be incorporated into an automated technical documentation system). Lest the reader think this is Buck Rogers' prognostication, such a triple duty device is already available for less than ten thousand dollars.

CONCLUSION

The equipment needed to perform efficient and accurate technical word processing is now available. The integration and programming of these devices are also available but limited in numbers.

Incorporating technical illustrations is pressing the current state of commercial availability. Significant cost reductions in the next year will bring automated preparation of technical text and illustrations well within the range of cost effectiveness.

THE XANADU™ HYPERTEXT SYSTEM: A NEW DOCUMENTATION MANAGEMENT TOOL

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Abstract

A new documentation management tool, "hypertext", lets the user decide how information will be interrelated and stored. Unlike traditional database management systems or keyword systems where the computer determines the interconnections automatically, hypertext systems allow explicit interconnections called "links". Arbitrary pieces of arbitrary documents and links themselves may be linked together. These links can be retrieved at will, along with information about what is being linked to what and about the nature and type of the link itself. It can correctly maintain these links in the midst of changes to the very data being interlinked.

Hypertext can maintain multiple versions of any given document, efficiently storing the common portions in common, with separate portions of storage required only for those parts of the documents which are actually different. It can provide historical traceback information in dated chronological order about any and all changes to a given document. It can do all of this efficiently, with only logarithmic overhead in terms of both storage space and response time.

Hypertext systems could make it easier for technical communicators to update documentation, edit previously written materials into new documentation, keep track of their own and their departments' work, and obtain feedback from users of online documentation. User feedback logs can be constructed by allowing users to link their own comments to text they find obscure or confusing.

Douglas Engelbart has created a hypertext system (called "Augment") at Tymshare capable of functioning with limited databases. Ted Nelson and his colleagues at Project Xanadu are implementing The Xanadu(tm) Hypertext System, designed to handle databases as large as a worldwide library. Project Xanadu has a working demonstration and plans to deliver a working prototype hypertext system within the year.

INTRODUCTION

A new documentation management tool, "hypertext", lets the user, rather than the software system, decide how information will be interrelated and stored. It is a system designed to handle text in all of its complexity. Today's technical communicator faces information management nightmares such as changing one basic manual to reflect the differences in several installations, or to suit each particular customer's needs. Hypertext offers a unified way to solve such problems.

Currently, most documentation management consists of two phases. First, a document is written or edited using a text editor or word processing software package. It is then kept track of using storage and retrieval systems such as database management systems, keyword systems, or fulltext search systems. These systems implicitly determine the interconnections and comparisons a user can make between documents, whereas hypertext systems allow the user to make explicit interconnections called "links". To understand why hypertext systems are a unique concept, let us look more closely at word processing and some of the more popular storage and retrieval methods.

A LOOK AT CURRENT DOCUMENTATION MANAGEMENT SYSTEMS

Word processors and text editors are fine tools for manipulating text within documents, but are usually not well coordinated with storage and retrieval functions. They generally do not deal with relationships between documents that may exist. As Ted Nelson says (1), this state of affairs forces the writer or editor to stop working at the boundaries of a document, which, to some extent, limits thought. There is no convenient way to show relations between documents. Also, word processors and text editors often tend to limit the size of the documents a user can work with. Storing documents in files means that the user has to think up file names, worry about file conventions, and keep track of files on paper, or with a separate system. Most text editors or word processors have no way to keep track of changes resulting from the editing process other than keeping an old copy and a new copy online or a trail of all the editing changes. This means storing a lot of copies.

In keyword systems, keywords are usually attached to a text for reference. A user asks the system to find all the articles with certain keywords contained within them, and it searches thru its database looking for them. Keyword systems function well as card catalogs; however, since not all thoughts can be expressed in one word, problems arise. What seems an obvious keyword to you may not be a keyword to the author. Thus the article is not listed by the word that you may be looking for, though it may be listed by keywords that you have not thought of. Keyword systems are not designed to let a user edit while remaining within the system. Explicit citations within or between documents cannot be created.

Keyword systems are a subset of the more general type of storage and retreival system called fulltext search systems. With fulltext search systems, a user types something like a phrase or a sentence which might be found in the document he or she wishes to find. The system searches its database for the text until the desired document is located. Fulltext search systems give users more latitude in expressing thought than keyword systems, thereby increasing the user's chances of finding all the pertinent references. But like keyword systems, fulltext search systems do not let users edit without exiting from the system. They do not allow users to make explicit citations, notes, or other connections between documents.

Data base management systems, or DBMS, provide excellent means of storing and retrieving any type of data which will fit into a fixed field format. Any data that can be grouped into lists may be stored in a database management system, which will let users make certain kinds of very useful comparisons between the fixed fields. Parts lists, numerical data, and personnel records are examples of data best suited to these systems. Data base management systems are not optimized to edit, store, or retrieve documents because text is too complicated. DBMS are sometimes used for keeping track of names of journals or articles. Because there is often no standard way of abbreviating journal names, users may have problems with this application.

The following table, Table 1, summarizes the differences between current documentation management tools and the Xanadu Hypertext System.

Table 1

	Database Management System	Xanadu Hypertext System	Word Processing System
type of material stored	quantitative data	any	text
form of material stored	relatively fixed-size records	variable sized documents	variable size documents (in good systems) or fixed size chunks of text (in bad ones)
organization of material stored	highly regularized	arbitrary	only documents of text
diversity of organizational structure allowed	generally limited to a small set of predefined structures provided by the system administrators	unlimited	only chunks of text
interpretation of data	method of data interpretation is imposed by the system; users generally have little or no control over this	system makes no a priori assumptions about the interpretation of data	all is text
interconnectivity of data allowed	generally limited by the particular design; often only simple hierarchies are allowed	arbitrary	sometimes a simple directory; no interconnections per se allowed
ability to cope with multiple versions of material stored	none	efficient and fully generalized document versioning facility	you can keep backup diskettes if you want (maybe)
storage overhead with increasing volume of data stored	often "blows up" with large bodies of data	logarithmic to a large base	keeping track of things is up to the user
system response time with increasing volume of data stored	often degrades badly as volume of data grows	effectively constant	constant -- neglecting the time it takes to find and swap diskettes
user interface	generally limited to some sort of query language, along with a nonstandard assortment of utility programs which may or may not work well together	design supports arbitrary frontends which may apply whatever interactive techniques are most appropriate to a given application	built in text editor and formatter

HYPERTEXT: NONSEQUENTIAL WRITING

As the above discussion shows, the current approach to documentation management requires more than one tool to work with text and is restrictive when users need to interrelate documents. However, the real problem is that current systems are not designed to let people use computers in the same way and with the same ease that they use paper. Hypertext, which means nonsequential writing, is a system based on the way we use paper to read, write and file. The term was coined by Nelson, the originator of the concept (2,3).

To understand what nonsequential writing means, let us look at an example that will be familiar to many technical communicators. Consider the amount and the complexity of paperwork required to build an airplane.

Suppose that the project engineer decides to move the wings on an airplane to a slightly different position on the fuselage. Many design documents will be affected by this change, perhaps thousands of them. To change the wing, he must first find all the components that will need to be modified. The change must then be made, but only after searching through the blueprints to make sure that this change will not adversely affect anything else. Once this is done, the technical communicators must update all affected documents to reflect the changes.

For something as seemingly trivial as changing the position of one bolt, the engineer has to know what components may be affected. For example, rewiring may be required if the bolt is moved into the path of a cable. Since our fictitious aerospace company doesn't have strings connecting its technical documents together, the writer or someone in the project must spend an appreciable amount of time chasing down all the documents which refer to that bolt. A common expression in the aerospace industry is, "When the paperwork weighs as much as the aircraft, the plane is finished."

In the above example all documents (including blueprints) written about that plane constitute a literature, or a hypertext. Because everything contained within this literature concerns some aspect of the airplane, it is interconnected, as if by a network of invisible strings.

DEVELOPMENT OF HYPERTEXT

The idea of hypertext was born in 1960 when Ted Nelson decided to design a computer system which would allow him to make multiple versions of articles or documents out of the same pieces of text. His ideas on hypertext and on what computers could be like were published in the 1974 underground classic Computer Lib/Dream Machines. The book attracted the attention of some brilliant young men who joined Nelson. They finished designing and began implementing a hypertext system that could retrieve hypertext in a reasonable response time out of a database (or "docuverse") as large as a world library (4). The effort, named Project Xanadu, created the Xanadu(tm) Hypertext System. It licensed a company, XOC, to market the system for commercial applications.

Douglas Engelbart and Andries van Dam have also done major work in the field of hypertext. Douglas Engelbart began work on an interactive editor and form of hypertext called NLS in 1959 (5). He is considered to be the father of several concepts related to hypertext such as word processing, networking, and teleconferencing. Now at TymeShare, his system is currently in use over a world wide network. The system is now called "Augment". It differs from Xanadu Hypertext in several aspects, the most notable being that links are embedded in the text and it is only capable of functioning with limited databases.

Andries van Dam implemented the first hypertext system in conjunction with Nelson at Brown University in 1968 (6). Since then two other hypertext systems have been implemented at Brown (7). Other hypertext research involved a prolonged use of hypertext in a poetry class (8).

I will be discussing hypertext as it is being implemented by XOC for the rest of this paper both because I am most familiar with it and because it is the most ambitious hypertext project to date. For a more complete discussion of other forms of hypertext mentioned see the excellent review article on interactive editing systems by Meyrowitz and van Dam (9).

THE XANADU HYPERTEXT SYSTEM

My colleagues at XOC who designed the Xanadu Hypertext System wanted it to be so simple that a child (or an English major!) could use it. Therefore they created a system design that lets us hide all the arcane and proprietary inner workings from users. Our system has two parts- a "back end" that the user never sees, and a "front end" that the user sees and uses. Don't be misled, however; this does not mean that the user sees two parts. It simply refers to internal organization of functions within a unified system.

The back end is responsible for storage and retrieval functions. This part of the system runs on large or very powerful computers which can be networked together. Every Xanadu Hypertext System will have the same type of back end.

The front end is responsible for display function and user interaction, including editing. Front end software will be modified to fit onto various types and sizes of computers, including personal computers. Since users and their needs differ, our designers wanted to make sure that the part of the system that they use may be modified to fit their tastes and preferences.

The Xanadu system is built out of "documents" and "links". A document is defined to be a string of contiguous characters. Thus a document may be text, graphics, blueprints, numbers, data, digitized voice, or music. Text that a user may want to store and link on a Xanadu could be in the form of memos, technical documentation, business letters, marginal notes, citations, grafitti, or hypertext poetry. The contents of documents and the connections between them are limited only be a user's creativity.

These explicit connections within a document or between documents are called "links". Arbitrary pieces of arbitrary documents and links themselves may be linked together. Links can be retrieved at will, along with information about what is being linked to what and about the nature and type of the link itself. A link is bidirectional so you can tell which point it came from and where it is going. The system can correctly maintain these links in the midst of changes to the very data being interlinked.

There are different link types for different purposes. Although just how a link type is displayed depends on which front end is used, the general forms can be discussed. Jump links are used to follow citations. In the current experimental front end, a user sees jump links as reverse video areas in the text he or she is reading. To find the other end of a jump link or any other link type, the user merely hits a control key on the computer keyboard. A window large enough to display the cited text opens within the original document so that the user may read the pertinent material, then continue reading the original text. If the new material proves to be more interesting, the user can enlarge the window and read the new document rather than the original.

Say that a user begins reading a document, and that he or she sees an interesting looking jump link to follow. After following the jump link, the user sees a second interesting citation within the windowed document. The user may "pass through the window" and call up a third document. If the third document proves to be uninteresting, the user may follow the same links back to his or her original document. Xanadu links allow users to pass through an infinite number of windows and back again (only a certain number of windows will be displayed on the screen at once). Nelson refers to this action as "navigating through the docuverse" (10).

Other link types include quote links, footnote links, and margin note links. They differ from jump links and each other only in the way in which they are indicated within a document, and where their type and size of display window will appear on the screen.

Perhaps the most useful feature of Xanadu for writers is its versioning capacity. Xanadu hypertext can maintain multiple versions of any given document, efficiently storing the common portions in common, with separate portions of storage required only for those parts of the documents which are actually different.

The front end will display a vertically split screen with a different version of the document shown on either side. Correspondences between versions will be indicated with connecting lines, and users will be able to scroll around in either version and edit.

All such editing will be logged by Xanadu's historical trace function. Xanadu can provide historical traceback information in dated chronological order about any and all changes to a given document. It can do all of this efficiently, with only logarithmic overhead in terms of both storage space and response time. For example, if the number of stored documents increases geometrically, the response time required to locate a particular one will increase only linearly.

Historical trace is not yet implemented, but it might look something like a branching tree on a future front end. A user could scroll along the tree with a mouse or a cursor until he or she reached the branch indicating the desired version of the document. A touch of a control key would display the document and associated traceback information on the screen.

USES OF HYPERTEXT

As the above discussion shows, the Xanadu hypertext system can help the technical communicator perform a variety of tasks with greater efficiency. The linkage and versioning capacities will make documentation updates less of a chore. The versioning facility can greatly help those who need to edit previously written materials into new documentation. Links make it possible for communicators to easily keep track of their own and their departments' work, and to obtain feedback from users of online documentation. User feedback logs can be constructed by allowing users to link their own comments to text they find obscure or confusing.

A unified information management system would also be useful to personnel outside the technical communications department. A hypertext system is such a general tool that it can be used for office automation, conferencing, and engineering projects. Hypertext is ideal for managers and executives who need a way to have information at their fingertips. It would enable them to make better decisions without wasting valuable time in meetings and paper shuffling.

As of this writing the Xanadu organization has a working hypertext demonstration and plans to deliver a working prototype system within the year. Different kinds of links work but the back end still requires six months to a year development work before the Xanadu Hypertext System is an "off the shelf product". Currently, the system runs on a Sun(trademark of Sun Microsystems) 68000 Workstation. It is written in the 'C' programming language running under the UNIX(trademark of Bell Laboratories) operating system, and can be made to work on almost any computer. When completed it will run on larger,modern machines with front ends running on a variety of machines, depending on demand.

SUMMARY

In summary, a new, more powerful and unified documentation management system called the Xanadu Hypertext System will soon be available. It will give users the freedom to organize documents to fit their needs, rather than the computer's.

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KEEPING TRACK OF WHAT GOES OUT:
AN INQUIRE DATABASE FOR COMPANY PUBLICATIONS

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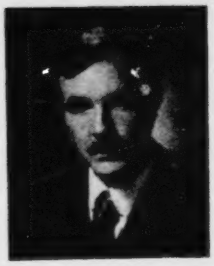
Standard Oil Company (Indiana)



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After maintaining eight inter-related, hard-copy publications files for 34 years, Standard Oil Company (Indiana) combined them into an INQUIRE database. The database is interactive, allowing the staff to enter data or search for information online. It contains an entry for each paper that is presented or published by Standard Oil's R&D staff. Each entry comprises twenty-three searchable parameters or fields and key words extracted from the title. INQUIRE was chosen as the database management system because it allows the data fields to have more than one value, so, for example, more than one author could be listed per paper, and it allows the fields to have variable lengths, which saves storage space. The information in each entry includes: type of document, title, authors' names and affiliations, and the bibliographic citation.

BACKGROUND: THE CLEARANCE PROCEDURE

Standard Oil Company (Indiana) and its Amoco companies require their research staffs to clear all presentations and publications with their immediate management, the management of subsidiaries sponsoring their research, and the Patents and Licensing department. To save time and effort, the company has appointed one person to coordinate the process.

Approximately 115 manuscripts are cleared each year. Not only does the coordinator assign each manuscript a number and keep track of it during the clearance procedure, but he also has to maintain files associated with those manuscripts.

THE WHYS AND WHEREFORES

We started keeping track of outgoing papers in 1949, but our records go back to 1928. After 34 years, the record keeping had evolved into eight cross-referenced paper files that required daily updating and entry.

- o The main file consists of the manuscripts and all the correspondence associated with them, organized by the manuscripts' assigned numbers.
- o The author file has an entry for each author of every paper, cross-referenced by the manuscript number of the paper.
- o In another author file, each entry contains a list, by number, of that author's publications.
- o One file is a list, by number, of all published papers that were cleared as they should have been.
- o Another file lists each paper, organized by an assigned letter code, that for one reason or another did not go through the clearance procedure.
- o The routing sheets for each manuscript are organized by the manuscript number.
- o And finally, we stock reprints of all our publications. They are organized by author.

Most of these files were kept on regular 3 x 5 index cards. Each card contained a manuscript number or letter code, a list of that paper's authors, and the bibliographic citations. Some papers were published or presented more than once. The entries for those papers contained citations for each publication and presentation.

In these times, "publish or perish" applies to industrial research centers as well as to academic institutions. As the number of papers grew, the time required to maintain the files became prohibitively large. Since clerical work is labor-intensive, the budget for maintaining the files became prohibitive, too.

The message was clear: we had to find a way to condense these files. True children of our times, we turned to the computer for help. We decided to computerize the files and combine as much information as we could into one record per manuscript.

HOW WE PUT THE FILE TOGETHER

At the time we were considering this file, the Amoco Research Center library was building online, searchable files to upgrade its book catalog and its Bulletin of Internal Information, which had been batch-loaded. The publications file seemed a natural extension of the new files, and our management agreed. Since the library's files were based on INQUIRE software, that meant ours would be, too. When it is feasible, we plan to concatenate the internal information and publications databases to make searching through them even easier; but right now they reside in separate areas of our computer system.

Designing the database

Two members of our staff are systems analysts who design and execute on-line, bibliographic databases. When they began automating our library files, they examined the four database management systems loaded on our corporate computers. A database management system is computer software that handles the storage and organization of data. It usually includes commands for retrieving data and preparing tailor-made reports, too.

The management system they chose for our databases is INQUIRE, a product of Infodata Systems, Inc. They chose INQUIRE for three reasons.

- First, an INQUIRE database operates in an interactive mode, so we can instantly retrieve any information we need.
- Second, the INQUIRE software allows data fields to have more than one value. In other words, if a publication has three authors, author number one goes into the first author slot in the data record; author number two, into the second author slot; and so on.
- Third, fields can have variable lengths, which allows us to save space. For example, we can define the title field as being no more than 250 characters. However, if the title contains 150 characters (including blank spaces and punctuation), we use only the space for 150 characters, not 250. The space we save this way is apparent when you consider that our database holds 3,500 titles.

One disadvantage of a system like INQUIRE is the amount of training needed to design a database with it. A person needs an extensive knowledge of computers as well as a four-day course on INQUIRE database design and development. Assistance from a systems analyst is necessary if you are going to build an INQUIRE database.

The enhanced publications file

Phyllis Steiner, one of our systems analysts, was assigned the publications database project. After we discussed the various files and logs that I used for the publications clearance, she prepared a list of all the data elements from our paper files and standardized data field names with the library's database. For every publication there are thirteen data elements, or data fields, as we call them. Some of the data fields are divided into subfields for ease in searching and printing. A total of twenty-three searchable fields and subfields comprise a publication record. The information included is listed below:

document number
document type
title
bibliographic citation
authors (up to six)
authors' affiliations
date abstract was received
date abstract was cleared
date abstract was approved
date manuscript was received
date manuscript was cleared
date manuscript was approved
manuscript announced in BINI
reviewers (up to seven)
reviewers' affiliations

Standard Oil's management has placed one constraint on the files we build, especially those files on the computer. They want all our documents cross-referenced by subjects, so our staff can find out what research we have done before. The hard-copy publication files were neither indexed nor cross-referenced by subject, so we enhanced the online file with key words. The key words are extracted from the titles, and they are searchable parameters in the file.

In designing the database, we made one concession for statistical reports. If a paper is submitted for review twice, we have to enter it into the database twice instead of just adding the additional information into the data record. For example, if I publish this paper in a magazine next year, there would be another complete record entered into the database for it. Although this means extra typing, a count of records set in this manner more accurately reflects the number of papers handled by the clearance coordinator.

HOW DOES THE PUBLICATIONS FILE WORK?

Data entry and database loading

Our systems analysts believe in submitting data to the database during the evening, when computer time is less expensive. In order to do this and maintain the illusion of immediate interaction, screens were designed for data entry. After the data fields were set, Phyllis wrote a program that displays the input screens on an IBM 3278 CRT terminal. We enter the data from the terminal display, and the program places the data in a file.

After the data has been entered, we print it, proof-read each entry, and make any changes using a software editor. Then the data is submitted to the batch machine on the corporate timeshare computer, which loads the data into the database during the evening. The next morning we receive a computer printout of the database loading and check for any problems that may have occurred. The previous day's entries are now available for retrieval, statistical manipulation, or updating.

Searching the database and generating reports

A menu of searching options is presented when the database is opened. When we choose an option, we are asked for specific information. Records that satisfy the criteria are displayed on the terminal. For example, option number two is searching for a publication by author. We type in the numeral two, and the terminal screen displays a prompt to enter the author's or authors' names. If we were not sure what is expected, we could type HELP. An explanation of the option and the format of authors names would then be presented. When we cleared the HELP screen, we would be returned to option number two to fill in the information. The database is then searched; and pre-set data elements from the records that meet the criteria, such as document number, title, and authors' names and affiliations, are displayed on the screen.

Certain options on the main menu will lead to submenus. One submenu allows authorized people to get specific statistics such as the number of papers published or presented by personnel of our parent company. Another submenu is for making changes to the data in the database; in this case, a password is needed so that changes can not be made by just anyone.

Reports can be generated using publication records. At this time we have not defined the format of our reports. However, with a search criteria of all publications submitted in a given year, we could prepare a list of the publications' titles, authors, and bibliographic citations. The list could be sorted by author, or even by bibliographic citation or company name.

HOW MUCH DOES ALL OF THIS COST?

Standard Oil Company (Indiana) has purchased eight copies of the INQUIRE software for its various corporate computers to handle different applications within the corporation. When we use any database management system, we are only charged for the storage of the data and use of the computer's resources. Data is stored on a magnetic disk in units, known as cylinders, that contain roughly 480,000 alphanumeric characters each. Our storage costs are $3 per cylinder. For the publications database we fill 18 cylinders, and the cost is $54 per month.

We have studied the costs for opening a database and then closing it without doing any retrieval. Based on our computer center's algorithms, this costs $1.25. The total cost for a search averages $2.00.

WHAT DO WE DO WHEN THE COMPUTER BREAKS DOWN?

The likelihood of a complete computer failure is almost negligible. However, the Computer Services department maintains back-up tapes of the data in case of emergency. We could reload the file from those tapes.

During short-term shut downs we rely on printed, cross-referenced files. We maintain printouts of authors, with the manuscript numbers assigned to each; of key words, with the manuscript numbers that apply to each; and of the manuscript numbers, with the dates they were cleared. Most routine questions can be handled from those printouts.

WHAT DID WE GET FOR OUR EFFORTS?

Management viewpoint

From our management's point of view, we have increased the efficiency of the clearance process and also increased our productivity. We have consolidated the equivalent of seven paper files (counting a subject file) into one central file, and we have eliminated the routing sheets. We will maintain the manuscript file and the reprint files as they were.

We have also made the information in the files more accessible than before. The data within the file can be more easily located, and now it can be sorted by many characteristics. In addition, we have relieved the duplication of paperwork and typing required to maintain this information.

Most important, from our managers view, we are on our way to one repository for our company's published information, and that information will be more accessible to our chemists and engineers.

Client viewpoint

Our clients are most impressed with their easy access to additional information. Now, if they call with a question about our publications, we can have the answer for them almost immediately. And if they opt to search the file themselves, they can do so with few problems, for the file can be used by more than one person at a time.

Everyone agrees that we have improved our service with this computerization. Now we can more easily track a manuscript as it moves through the clearance procedure; and once through, we have more information about each manuscript at our fingertips.

My purpose has not been to sell you INQUIRE. This sort of database could be adapted to any database management system in any editorial office. It has improved our service. We believe it would improve your service, too.

COMPUTERIZED INFORMATION RETRIEVAL

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ABSTRACT

The system demonstrated in this workshop is one part of a larger Publication Management System. This part enables us to store information (text and simple graphics) in a data base and to retrieve it again in sophisticated ways.

When people enter a public library, they sometimes want a specific book; other times, they have a topic in mind and want to browse. Our system, called RETRIEVE, quickly and easily satisfies both needs.

If you're "just browsing," RETRIEVE can give you indices of documents on any attribute — author, date-of-publication, title, type-of-document — whatever is most useful in your application.

If you want a specific book, RETRIEVE offers you several powerful ways to find it. Or any part of it; you can search for just that part of a document that suits you. Here are some of the ways you can search for information using RETRIEVE:

- **Keywords** — If you have a topic in mind, think of a word or phrase commonly associated with it. RETRIEVE will find and, if you like, show you all the information in which that word or phrase appears.

- **Information Descriptors** — When we create the pool of information for you to search, we add special descriptive labels both to each document and to its sections. These labels tell RETRIEVE something about what *type* of information a document contains, not the *topic* of the information, as the keywords do.

  By combining keywords and descriptors, you can narrow your search and find just the information you want quickly. For example, suppose you're working on your car and want instructions on changing the oil. If you searched using only the keyword *oil* you'd get back a lot of information irrelevant to your task —about oil capacity, transmission oil, oiling squeaky parts, etc. And if you searched using the keyword *instructions*, you'd find that the word itself never appears in the instructions for changing oil. However, if you search using both the keyword *oil* and the descriptor *instruction*, chances are you'll find just what you want.

- **Format Descriptors** — RETRIEVE enables us to search particular parts of a document's format. For example, if you recall seeing a flowchart in a document, you may want to restrict your search to illustrations, ignoring text. If the documents in your "pool" are in a rigidly specified format, you may want to restrict your search to headings (for example, to find all the abstracts or all the bibliographies in a set of documents).

A typical use of RETRIEVE might be, say, "Give me all diagrams (a format descriptor) from the circuit specifications (an information descriptor) on the XYZ400 (a keyword).

We are working now to further automate the task of preparing documents and putting them into the data base. We'll soon be adding a table of common synonyms; a user searching for information about "Bell Labs" will find information on Bell Laboratories, Bell Telephone Laboratories, Inc. and BTL (versions of our name) as well.

Mr. Mastropaolo demonstrates a RETRIEVE system containing the Bell Labs *Editorial Style Guide*. This book won an STC Award for Distinction in 1979.

1983

Graphics and Production Stem

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The Graphics and Production Stem has something unusual to offer this year--information, hard factual information--that writers and editors, as well as graphics and audio-visual specialists can use to be more effective in their work.

Presentations are designed to show writers and editors how visuals and thinking visually can help improve the communication process. At the same time, since a number of panels and workshops are being given by writers experienced in using graphics, graphics people will have an opportunity to learn the best ways to integrate their expertise with writers and editors to develop a better product.

This year's panels include: Tips for Using Graphics from Technical Writers,
The Writer's Role in Graphics Development,
and the latest on
New Techniques for Generating Tables, Graphs,
Charts and Photographs.

The emphasis this year is on quality, not quantity. Most panels have only two participants, which allows each individual more time to develop their presentations, and more time to interact with the audience. There is also a full range of hands-on workshop on: 1) page layout concepts and using type, 2) planning, developing and using still photography, 3) applying graphics to the problem of technical documentation, 4) using graphics to improve newsletter readability, and 5) the development and use of informational films. An additional feature this year is a unique seminar by the producer and graphic designer on how they put together the slide presentation which won the Best of Show at the 1982 ITCC.

There is also a demonstration of the latest video equipment and the latest techniques for developing software. A very special part of this year's stem is the keynote panel of experts who will address the question which consistently plagues all of us--Reaching Your Audience--Do Graphics Really Help?

YOU DON'T HAVE TO BE AN ARTIST TO PRODUCE AN ILLUSTRATED DOCUMENT

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Regardless of your drawing ability and experience, you can produce an illustrated document such as a paper, an article, or a book. In this paper, I will show you how I produce illustrated documents: how I determine when and where illustrations are needed; how I take action photographs; how I easily and quickly produce my own line drawings; and how I lay out a page that contains both text and illustrations. Using the procedure described in this paper, you should be able to produce your own illustrated documents for preliminary or final "camera-ready" drafts.

The most effective and proven means of communication when writing about technical subjects is a blending of text and illustrations. That practice, however, puts most writers of technical subjects on the spot. They are skilled either in their particular technical field or in writing, or in both. But seldom is a writer also a skilled artist. To complicate matters, in many cases no artist is available to the writer. Even if an artist is available, the artist is often not skilled in the technical subject matter and so may not be able to provide help in determining where and what kinds of illustrations are required.

I believe that a technical writer should possess the basic skills required to produce an illustrated document. In addition to deciding when and where illustrations are needed to explain a complex technical procedure or subject, the writer should be able to produce illustrations for that purpose.

This paper shows how I produce an illustrated document such as a paper, an article, or a book. It shows how I determine when and where illustrations are needed, how I take action photographs, how I produce my own line drawings, and how I lay out a page that contains both text and illustrations.

I plan illustrations early in the writing cycle, not as an afterthought when all the text has been written. The procedure explained in this paper is an organized approach to planning and producing an illustrated document.

1. Planning and Organizing

By asking myself the following questions, I determine what information I need:

a. What is the purpose and objective of the document (such as how to operate a product, how to program it, how to assemble it, or how to service and maintain it)?

b. Who is the audience? What is its skill level (technical skills, nontechnical skills, operator skills only, or no skills)?

c. How, where, and when will the audience use the document?

d. What material is to be covered in the document?

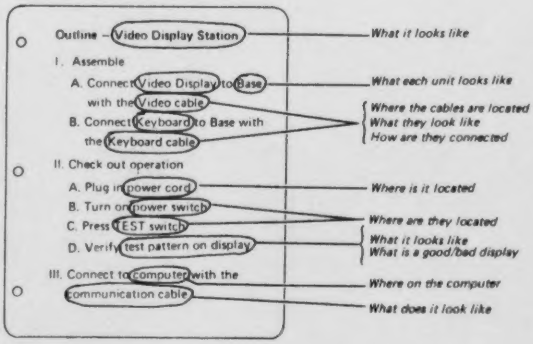
e. What source material (such as specifications and engineering drawings) do I need to write the document?

2. Making an outline

I organize my source materials and make a detailed outline of the material to be covered. In place of an outline, I sometimes make a list of steps required to complete a process or assemble a product.

3. Looking for gray areas in my outline

I look through my outline (or list of steps) for "gray areas." Gray areas are words or groups of words that may not prompt a clear image in the mind of the reader whose skill level I have defined. For example, the reader may be unfamiliar with or confused by what the product looks like, what is on the operator's panel, or how two parts fit together. I identify each possible gray area in my outline. Fig. 1 shows an outline with the possible gray areas listed.



Outline – Video Display Station
I. Assemble
  A. Connect Video Display to Base with the Video cable
  B. Connect Keyboard to Base with the Keyboard cable
II. Check out operation
  A. Plug in power cord
  B. Turn on power switch
  C. Press TEST switch
  D. Verify test pattern on display
III. Connect to computer with the communication cable

Fig. 1. Gray Areas

4. Removing the gray areas

I go through my list of possible gray areas and decide what needs to be done to eliminate them. There are two methods to remove gray areas: (1) expand the definition of unfamiliar words by using more familiar words or (2) use illustrations (photographs or line drawings) in place of or with words to illustrate and define new and unfamiliar areas. The first method is used effectively in the literary world of novels and books. In technical communications, however, where the subject is often complex, I find that the second method--using illustrations--is generally the best.

The following list helps me determine when and where to use illustrations:

- When I suspect that the reader may not know what the words represent.
- When there is a need for immediate comprehension.
- When the subject is complex.
- When the action occurring between objects is complicated.
- When I want the reader to see an exact image. Without the illustrations, readers read the text and form their own images, which may not be correct. For example, when people read the word **bird**, they see a mental image of a specific type of bird. Some see a chicken or crow; others, an eagle. If I want all my readers to see the same type of bird, I show them a picture.

From my list of gray areas, I then determine what illustrations are required. Fig. 2 shows the list of illustrations required to remove the gray areas, which are circled in the outline.

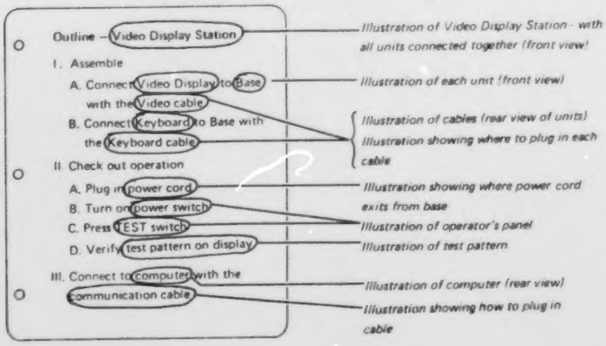

Outline — Video Display Station
I. Assemble
A. Connect Video Display to Base
with the Video cable
B. Connect Keyboard to Base with
the Keyboard cable
II. Check out operation
A. Plug in power cord
B. Turn on power switch
C. Press TEST switch
D. Verify test pattern on display
III. Connect to computer with the
communication cable
Illustration of Video Display Station - with all units connected together (front view)
Illustration of each unit (front view)
Illustration of cables (rear view of units)
Illustration showing where to plug in each cable
Illustration showing where power cord exits from base
Illustration of operator's panel
Illustration of test pattern
Illustration of computer (rear view)
Illustration showing how to plug in cable

Fig 2. Illustrations Required to Remove Gray Areas

5. Determining whether to use photographs or line drawings

Once I have my list of required illustrations, I determine whether to use a photograph or a line drawing for each illustration. Both photographs and line drawings can be used in the same document. The two may be used together; for instance, a photograph to show the overall view of a machine and line drawings to show exploded views of detailed areas. Line drawings are generally the best way to go because the amount of detail can be controlled and they are easily revised. In addition, they can be easily reproduced and reduced in size on an office copier.

I use the photo-tracing technique described in step 7 to easily produce line drawings by placing tracing paper over a photograph and tracing only the important areas of the photograph. First, however, I photograph the subject for each illustration--whether it requires a photograph or a line drawing.

6. Taking the photographs

Using my list of required illustrations, I take photographs that show the details needed to eliminate each of the gray areas I have identified.

My photographs show people in action, operating or handling the product in the manner in which I am trying to describe it. Putting people in photographs (especially showing the positions of their hands) saves words by pointing out details such as how and where to hold an object; how to lift, carry, or move a product; how many people are required to do a task; and how to move levers, insert diskettes, put parts together, and remove things.

To put the reader in the same perspective as when he or she views and handles the product, photographs should show an over-the-shoulder view. Therefore, to photograph people in action poses, I stand behind them and take the photograph over their shoulder.

I take the photographs with either an instant-photo camera or a 35-mm or larger format camera. Although using either type camera has its advantages and disadvantages, I have found taking photographs with a 35-mm camera loaded with negative film is the method most effective and reasonable in cost, time permitting. To ensure getting a satisfactory photograph, I always take several shots from different angles and positions. I then send the exposed film to a local photo processor for developing and ask to have a contact sheet, rather than prints, made from the negatives. A contact sheet is an 8-inch by 10-inch sheet of photographic paper that contains miniature prints of all exposures. For each roll of 36-exposure film, I get back one contact sheet. I look over the prints on the contact sheet, circle the ones that I want, and have 8-inch by 10-inch enlargements made of only those.

When working within a tight schedule, I use an instant-photo camera and make line drawings directly from the prints.

7. Producing the line drawings

At this point, I produce my own line drawings. You may be saying to yourself, "I am not an artist; I can't even draw a straight line. How can I produce line drawings?" I find that producing adequate drawings is not difficult with the following photo-tracing technique.

I use these materials:

- Photographs (from step 6)
- Tracing paper
- Pen with black ink
- Masking tape
- Ruler or straightedge
- A light box (a box containing a light fixture inside and covered with a translucent panel)--not absolutely necessary

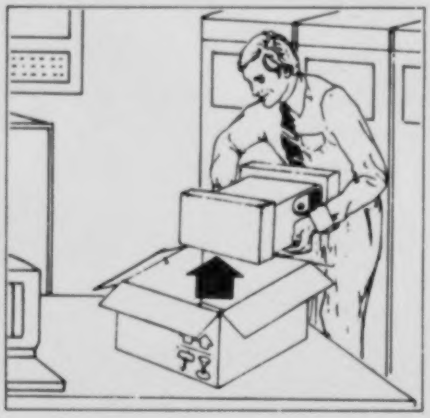
To make a line tracing from a photograph:

a. I tape the photograph on a light box. The light box allows light to pass through the photograph, making it easier to trace. If you do not have a light box, you can tape the photograph and tracing paper to a window pane for the same effect as that of a light box.

b. I tape tracing paper over the photograph and make a line drawing by tracing the areas of the photograph that I feel are important to make my point. I select which details to include and which are not important. I can reduce the line drawings in size with any office-copier machine that has reduction capability.

I avoid cluttering my line drawings with unnecessary details. Examples 1 and 2 in Fig. 3 show a person removing a machine from a carton. Example 1 is cluttered with unnecessary details, such as facial features, hair, clothing and background. These details divert the reader's attention from the main objectives of the illustrations. Example 2, which is simple and uncluttered, draws the reader's attention to the action of removing the machine from the carton.

Example 1. (Not recommended)



Example 2. (Recommended)

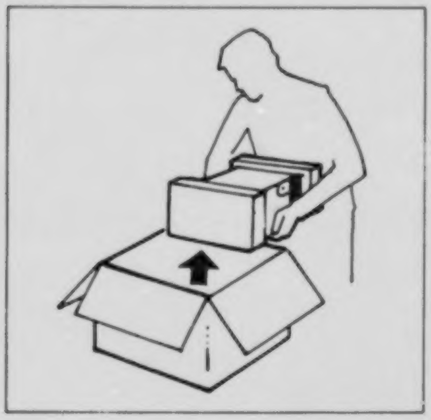


Fig. 3. Unnecessary Detail Removed from a Line Drawing

8. Laying out the illustrated page

To lay out an illustrated page, I use the following materials:

- Razor-tip knife
- Scissors
- Transparent tape, rubber cement, or spray adhesive
- Templates (described in the following text)
- Dry-transfer artsheets (described in the following text)

For my illustrated document to be effective, I must design and lay out each page to ensure that the proper text and illustrations are together. I then put together the illustrated page (see Fig. 4):

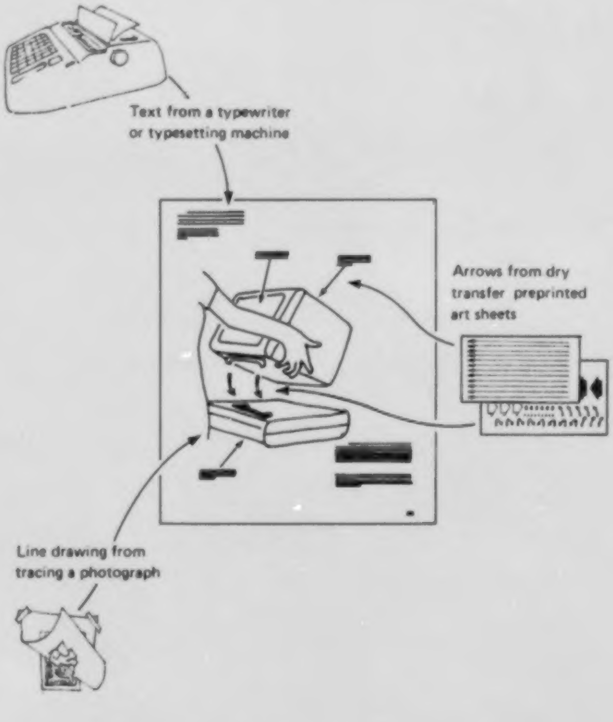

Text from a typewriter or typesetting machine
Arrows from dry transfer preprinted art sheets
Line drawing from tracing a photograph

Fig. 4. A Page Containing Both Text and Illustrations

a. I begin by attaching the line drawing to the paper. I tape it down using either transparent tape or adhesive (rubber cement or spray adhesive). I attach the illustration to the paper gently; I do not press down hard on the taped or adhesive-backed illustration so that I can reposition it if necessary.

b. I then add text around the line drawing. I type the text and fasten it to the paper in the same way as the illustrations.

c. I use thin arrows from dry-transfer artsheets to act as leaders or pointers.

d. I use bold arrows from dry-transfer artsheets or a template to show action and direction in my line drawings. These arrows can save words by showing specifics such as direction or rotation; which way to turn product parts such as knobs, handwheels, and adjustment screws; and which direction to push levers, switches, and other controls. Fig. 5 shows examples of using action arrows in illustrations.

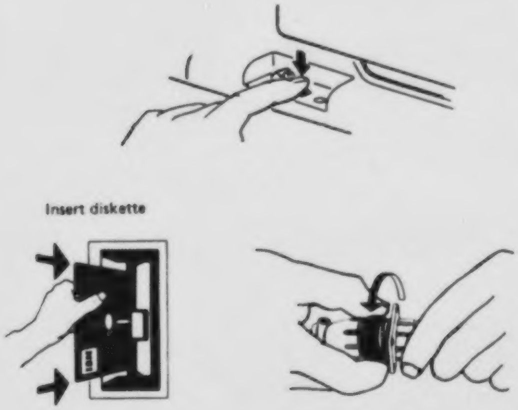


Fig. 5. Action Arrows in Illustrations

With the techniques described in this paper for planning a document, determining when illustrations are needed, and making line drawings, I can produce well-illustrated documents that communicate with my:

- Reviewers and approvers, for preliminary review drafts.
- Artist (or art vendor). If I am doing only rough line drawings for a preliminary draft, an artist can do the final drawings and layout quickly and easily from my draft with little or no further instructions.
- Intended audience defined when I began organizing my document, for final "camera-ready" drafts.

This paper has been excerpted from an article to be published in the Institute of Electrical and Electronics Engineers, Inc. (IEEE) Transactions on Professional Communication.

KEEPING A GRAPHICS SCRAPBOOK

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As willing and as intentional as you, as a technical writer, may be to use effective graphics in a publication, your mind may go blank at the time of implementation. You have been trained to think in text and to use graphics simply as illustrations of the text–not as the primary means of communication, but as secondary.

A Graphics Scrapbook can immediately stimulate innovative imagination and serve as an "idea book". Browsing through it and seeing the ways in which similar technical information has been presented can trigger a lightning-like, inspired concept of how you can modify the example in the scrapbook to fit your material or give you a whole new idea about how you can present your material.

To make a good Graphics Scrapbook, you must develop a "graphics awareness", then make a copy of each unusual, effective example, as you find it. Place your collection in a three-ring binder with appropriate side tabs so you can quickly turn to a desired type of graphics, such as "keyboards", "graphs", "explosions", or "panels". A Graphics Scrapbook is a continuing, ongoing project in which you not only act as a talent scout and researcher, but as a salesman to persuade others to contribute their "findings" and to reap the benefits of your combined efforts.

As all of us know, the trend in publications is toward a greater use of graphics. Even outside the publications field, we see international, standardized symbols used in airport terminals and along the interstate highways. These direct the traveler to a restaurant, a telephone, or rest rooms; or indicate to him that he is approaching an intersection of roads, an area of road curves, or a deer crossing. These symbols convey their meaning far more quickly than a sign with wording, and there is no misunderstanding, either in this country or abroad, because of a mistranslation into another language.

Just as a picture can take the place of a thousand words, any form of graphics--including symbols, charts, graphs, diagrams, sketches, photographs, line art, or tables--can replace text, with the advantages of being more easily and more quickly comprehended. Graphics also makes any publication more attractive and inviting to the reader. In the case of customer setup procedures, the primary means of communication with the reader is by line art or photographs, with a minimum of text.

Yes, you do recognize the value and importance of graphics, but when it comes to using graphics, your best intentions often fail to inspire you with any original concept of how to include them in a particular publication. You write clear, accurate, complete wording to express the necessary thoughts--because you think in words, rather than in pictures or graphics.

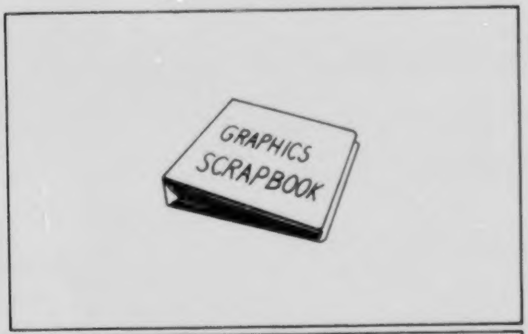
So first, in a publications organization, an education program is needed--perhaps a seminar with discussion and follow-up meetings--to train old and new writers to think in graphics, rather than in text, to express their ideas. You need to practice looking for the "overall effect" in comprehension and to try to sharpen your awareness of how much and how often you can use graphics.

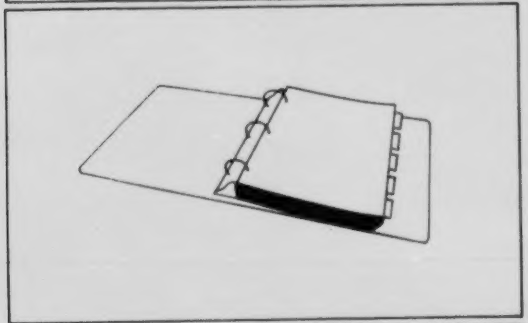
But you still need a starter, something to trigger your imagination, so you can begin working in graphics. This is when you reach for your Graphics Scrapbook! Browse through its pages. It is an "idea book"--full of examples of successful communication through graphics.

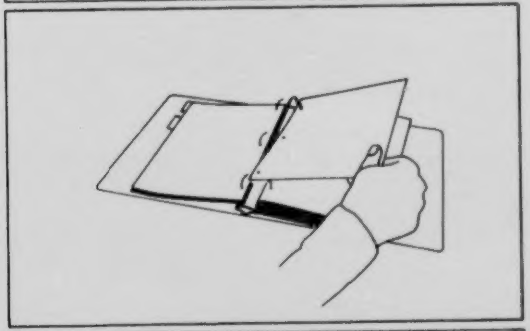
Are you wondering how you can best show groupings of keys on a specialized keyboard? How you can make callouts more readable in a photograph with a dark background? Or perhaps, simply, how you can show the major parts of a manual, graphically, by subject? If you have a particular problem, you can look in your scrapbook for ways in which it can be treated, but if you are in the first stages of developing the publication, it can be helpful just to leaf through the pages until you see something that could be modified to fit your presentation. Possibly two treatments might be combined in a unique way or you may think of an improvement when you see what has been done before.

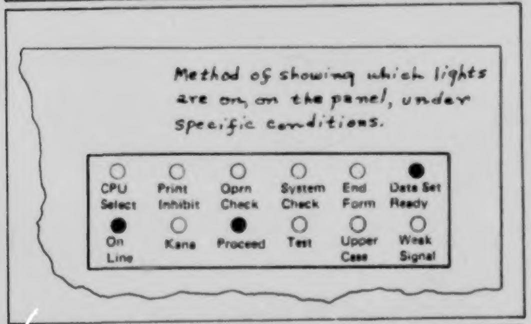
In any event, looking through your Graphics Scrapbook will help focus your thoughts into graphics channels. You might find an example that you can discuss with your art department for possible adaptation and use in your publication.

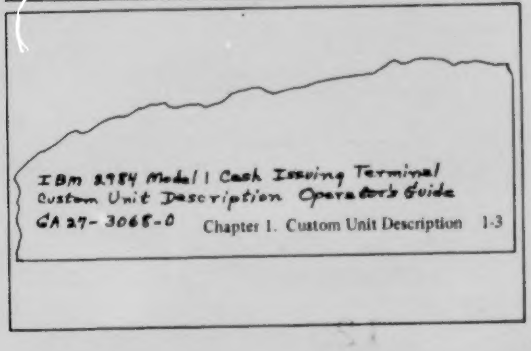
A good Graphics Scrapbook is not bought at a bookstore; it is slowly compiled, piece by piece. It is an on-going, continuous project in which not only you, but others, play a part.








Method of showing which lights are on, on the panel, under specific conditions.
CPU Select
Print Inhibit
Oprn Check
System Check
End Form
Data Set Ready
On Line
Kana
Proceed
Test
Upper Case
Weak Signal


IBM 2984 Model 1 Cash Issuing Terminal
Custom Unit Description Operator's Guide
GA27-3068-0 Chapter 1. Custom Unit Description 1-3

To begin your Grapics Scrapbook, find a sturdy three-ring binder and add several sets of page dividers with side tabs. When you find an effective graphics technique that is worth remembering, whether it is in a published manual, a news magazine, an annual corporation report, or even direct mail advertising--make a copy of that page, punch holes in the left margin, and insert it in your scrapbook. Ask: "What is it a good example of?" Use your answer as the subject for a side tab.

Now, using red ink, print your comments about this graphics example on that page--such comments as "Exploded view of the contents of individual bytes", "Use of outlined zip arrows", or "Method of showing which lights are on, on the panel, under specific conditions". Mention any points you wish to have the reader notice. In essence, this comment gives the reason why you included that page in the scrapbook.

Then, at the bottom of the page, in black ink, print the title and date of the publication from which the page was copied--or the appropriate identification for the source of the page. This information can be of possible interest or value in the future.

It is a good idea to spend a few minutes of spare time you may have, from time to time, in checking your technical library for manuals from other sites of your company, or from other companies, for innovative graphics treatments. This will be helpful in keeping you up-to-date in the state-of-the-art. It can be useful, also, to solicit the cooperation of other technical writers in your department and also of the people in the art department. When others know what you are doing, they will not only think of you and the scrapbook when they find some unusual examples for you, but they will take an interest in the project and may ask to see the scrapbook, later on, to use it as an "idea book", themselves.

Within your department, it is important to inform both old and new technical writers to be on the alert for good additions to the Graphics Scrapbook and how they, too, can profit by it. One way to maintain a Graphics Scrapbook awareness is to circulate the scrapbook, with a routing slip, once each quarter.

If a particular graphics technique is an example that can be placed under more than one heading, it is better not to cross-reference it. Instead, make additional copies of that page and place a copy under each side tab heading that is applicable. Also, when you comment in red ink, draw the attention of the reader to the part of the example that applies to that particular heading.

If you wish to, you may also include some "horrible examples" (and you will find them!), in addition to your "positive, constructive" examples. Even though this may sound negative, it can serve a useful purpose. It will definitely sharpen the distinction between good and bad examples of graphic techniques, in your consciousness.

Your Graphics Scrapbook can not only serve to suggest possible graphics for publications; it can be helpful in staff studies, slide presentations, or flip chart presentations.

Some possible headings for side tabs are: Instructions, Arrows, Zip, Components, Explosions, Panels, Flow, Tables, Boxing, and so on. The actual headings you use will depend upon the particular type of publication you are working on and the type of art or graphics appropriate for it. In other words, your Graphics Scrapbook will be distinctively yours, tailored to your use, and because of this, it will be especially helpful to you.

Be aware of all good graphics ideas in print, from any source. You will then find it easier for you to think in graphics.

After you return to your work from this Conference, begin to compile your Graphics Scrapbook.

Try it--you'll like it!

Design/Formats/Structures/Tools

The Importance of the Designer in the Process of Developing Technical Documentation

Elizabeth Heitzmann

Suzanne Watzman

Watzman/Heitzmann Design Associates
26 Otis Street
Cambridge, Massachusetts 02141
617/868-8110

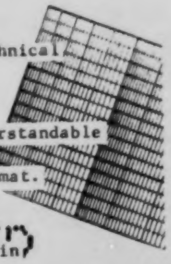
An examination of the ways in which design and the graphic designer's point of view can contribute to the overall process of developing technical documentation.

- A Team Approach
- Structuring Information
- Readability V. Legibility and Other Design Principles
- Standardized Formats: Modules Codes, and their Application
- Non-print Design Applications
- Available Technologies
- Case Studies

In today's marketplace,
with the increasing importance
of documentation
and its potential
to substantiate claims
of product ease-of-use and
"user friendliness" --

- **CLEAR,** thought-out
- format design
- becomes an ***active***
- component in its success.

Accurate and well-written documentation can be buried by
The lack of a corresponding visual structure.



Extremely complex technical
information
can be made more understandable
by a clear visual format.

DEVELOP
ID INFL

Current technologies in
word-processing, typesetting,
and page-layout systems are
making formatting systems
even more efficient,
cost-effective and powerful.

ENAI
NANCE
MAINTENAI

Watzman

Heitzmann

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SSAGE MAINTENANCE
OURCE TEXT MAINTEN
N SUBSYSTE

The Need for Documentation Design

The Landscape and Marketplace

The complex environment.
A bewildering invasion of technologies.
Multiplicity of competing products.
Difficulty of product differentiation.
As markets expand, numbers of
less sophisticated users increase
and product ease-of-use
becomes a prime selling tool.

The first opportunity to demonstrate ease-of-use is in the product documentation, and the first encounter is the

FIRST IMPRESSION:

the APPEARANCE of ease-of-use, the:

- structure
- organization
- clarity
- hierarchy
- accessibility
- useability

of the technical documentation.

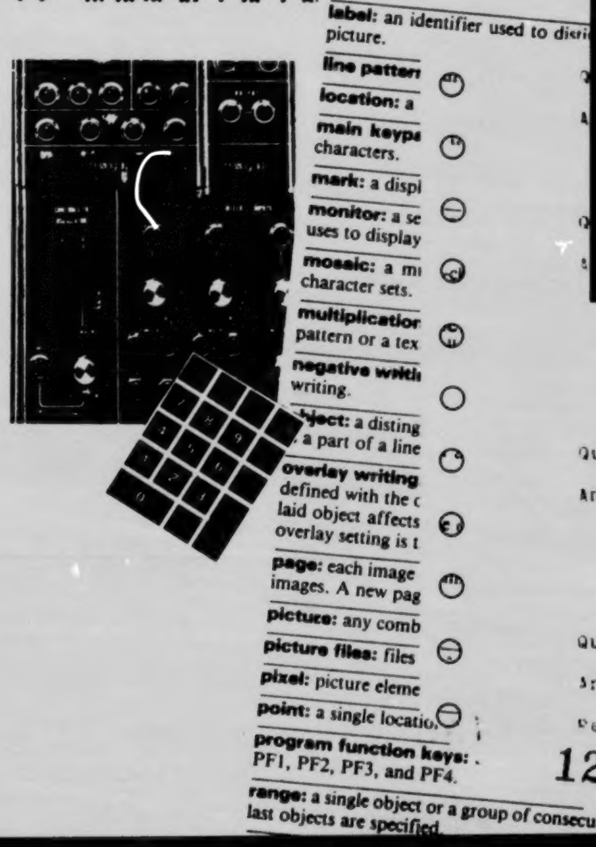
The appearance is at the same time subconsciously saying very revealing things about the Company's attitude towards its customers after the product sale -- about its committment to continued support, updates, enhancements, product design geared to customer needs.

All of this comes only from the level of a quick overview.

In the long term, clearly designed and structured documentation functions better -- through a comprehensible structure, clearly presented examples, tables, diagrams.
The product can be better utilized.
The users become committed.
The support staff is released from the time-consuming task of dealing with problems covered in the documentation.

Is your documentation working

FOR or AGAINST you?



label: an identifier used to disti
picture.

line patter

location: a

main keypa
characters.

mark: a displ

monitor: a se
uses to display

mosaic: a m
character sets.

multiplication
pattern or a tex

negative writi
writing.

object: a disting
, a part of a line

overlay writing
defined with the c
laid object affects
overlay setting is t

page: each image
images. A new pag

picture: any comb

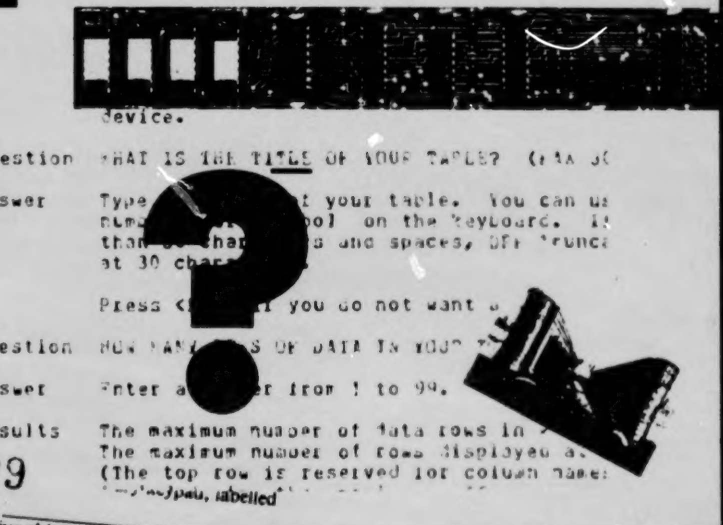
picture files: files

pixel: picture eleme

point: a single locatio

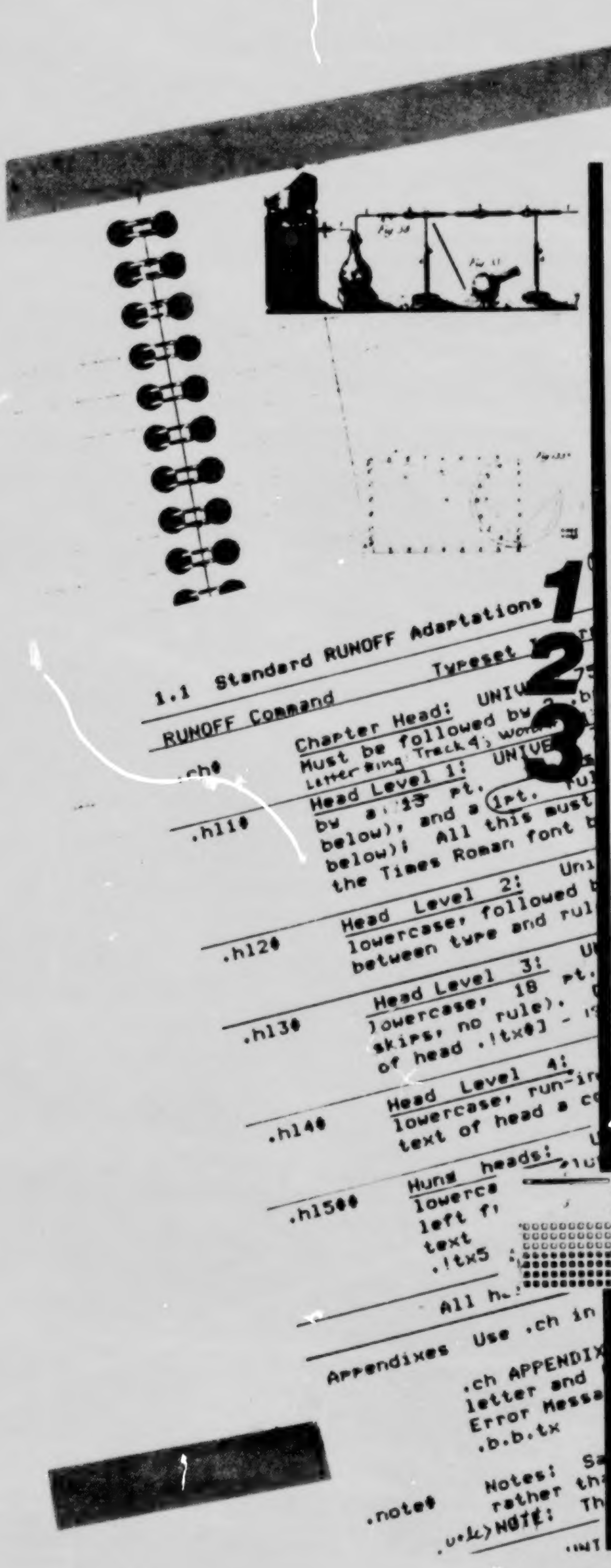
program function keys:
PF1, PF2, PF3, and PF4.

range: a single object or a group of consecutive objects with
last objects are specified



```
device.

Question   WHAT IS THE TITLE OF YOUR TABLE?
Answer     Type              t your table.  You can u
           num                ool  on the keyboard.
           than      char      s and spaces,
           at 30 char
           Press <          f you do not want
Question   HOW MAN      S OF DATA IN YOUR
Answer     Enter a      er from 1 to 99.
Results    The maximum number of data rows in
           The maximum number of rows displayed a
           (The top row is reserved for column name
                    labelled
```



1.1 Standard RUNOFF Adaptations

RUNOFF Command
Typeset

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Lettering Track 4; wo

.hl1 Head Level 1: UNIVE
by a 13 pt.
below), and a 1pt.
below); All this must
the Times Roman font

.hl2 Head Level 2: Uni
lowercase, followed b
between type and rul

.hl3 Head Level 3: U
lowercase, 18 pt.
skips, no rule).
of head .!tx0] -

.hl4 Head Level 4:
lowercase, run-in
text of head a c

.hl50 Hung heads:
lowerca
left f
text
.!tx5

All h

Appendixes Use .ch in
.ch APPENDIX
letter and
Error Messa
.b.b.tx

.note Notes: S
rather th
.u.l>NOTE: Th

The Process

Team approach: INTERACTIVE process
Including: project coordinator, writers, designer, production staff,
for more efficient and complete communication,
& a more effective end-product.
The importance of getting management's support, understanding, and committment -- at the outset and throughout the process.

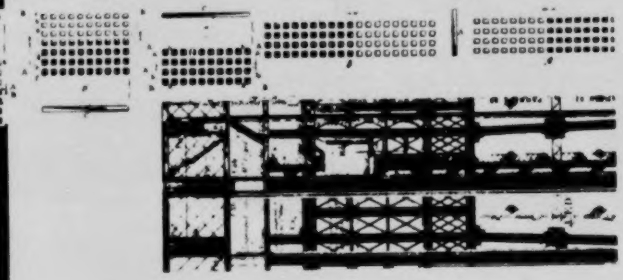
The designer as CATALYST:

Design input at this stage:
- . overall organization (set & volume)
- . clarifying document structure and hierarchy
- . layering concept of information
- . how will the documentation actually be used? in what sequence? for what tasks? what is most important? 2nd? 3rd?
- . graphic tools developed with particular end-user's needs in view
- . VISUAL MAPPING: page layout, contents, index, cross-referencing, "maps"/tools/visual keys & cues to find your way around the page and the entire documentation set

Value of standardization:
provides writing structure, shortens writing time
shortens production time
consistancy makes it more useful for the reader.

The importance of sufficient time spent at this initial stage;
critical to the task of producing a system of formats sufficiently flexible to accommodate a variety of materials over the long-term use.

Modular format design.
The necessity of understanding the purpose of formats:
- . as visual equivalents to the information structure (and writing process)
- . as tools and building blocks applicable to a range of situations, rather than a limiting, rigid, fill-in-the-blanks prescriptions
- . as tools applicable at all stages: writing, terminal screens, printout drafts, typesetting and layout systems



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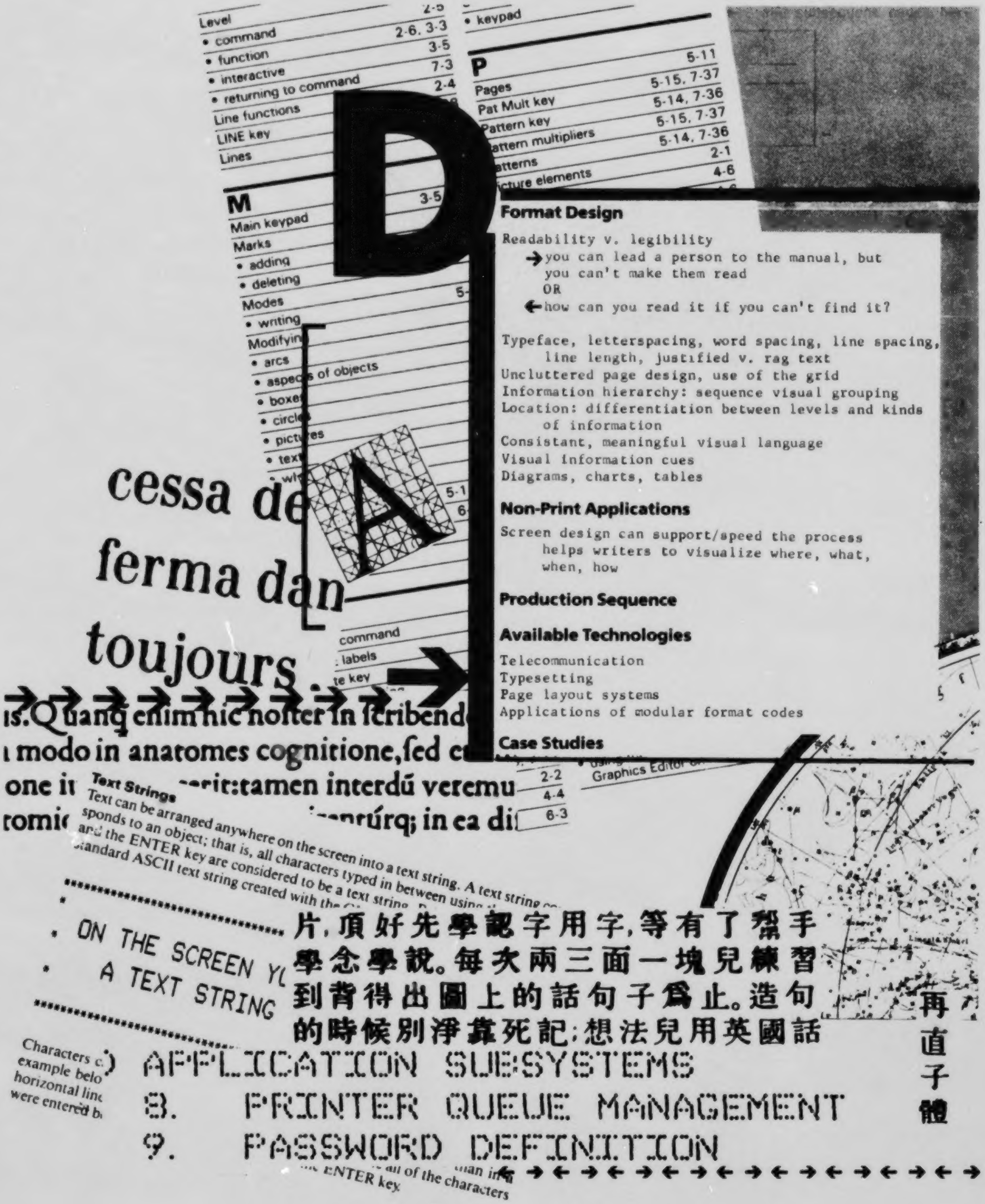
Level
• command 2-6, 3-3
• function 3-5
• interactive 7-3
• returning to command 2-4
Line functions
LINE key
Lines
M 3-5
Main keypad
Marks
• adding
• deleting
Modes
• writing
Modifying
• arcs
• aspects of objects
• boxes
• circles
• pictures
• text
• keypad
P 5-11
Pages 5-15, 7-37
Pat Mult key 5-14, 7-36
Pattern key 5-15, 7-37
Pattern multipliers 5-14, 7-36
Patterns 2-1
Picture elements 4-6
D
A
cessa de
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command
labels
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2-2
4-4
6-3
Graphics Editor
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Text Strings
Text can be arranged anywhere on the screen into a text string. A text string co
sponds to an object; that is, all characters typed in between using t
and the ENTER key are considered to be a text string.
standard ASCII text string created with the G
. ON THE SCREEN Y
. A TEXT STRING
Characters c
example belo
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were entered b
all of the characters
ENTER key
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學念學說。每次兩三面一塊兒練習
到背得出圖上的話句子爲止。造句
的時候別淨靠死記；想法兒用英國話
再直子體
APPLICATION SUBSYSTEMS
8. PRINTER QUEUE MANAGEMENT
9. PASSWORD DEFINITION

Format Design

Readability v. legibility
→ you can lead a person to the manual, but
you can't make them read
OR
← how can you read it if you can't find it?

Typeface, letterspacing, word spacing, line spacing, line length, justified v. rag text
Uncluttered page design, use of the grid
Information hierarchy: sequence visual grouping
Location: differentiation between levels and kinds of information
Consistant, meaningful visual language
Visual information cues
Diagrams, charts, tables

Non-Print Applications

Screen design can support/speed the process
helps writers to visualize where, what, when, how

Production Sequence

Available Technologies

Telecommunication
Typesetting
Page layout systems
Applications of modular format codes

Case Studies

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A GRAPHIC ARTIST IN COMPUTERLAND

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Los Alamos, New Mexico 87545

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Los Alamos National Laboratory
Public Relations Specialist
Group H-4, Mail Stop K493
Los Alamos, New Mexico
(505) 667-3764

1981 International Graphics, Inc., two merit awards for computer-generated presentations

The field of computer graphics is rapidly opening up to the graphic artist. It is not necessary to be a programming expert to enter this fascinating world. The capabilities of the medium are astounding: neon and metallic effects, translucent plastic and clear glass effects, sensitive 3-D shadings, limitless textures, and above all color. As with any medium, computer graphics has its advantages, such as speed, ease of form manipulation, and a variety of type fonts and alphabets. It also has its limitations, such as data input time, final output turnaround time, and not necessarily being the right medium for the job at hand. And finally, it is the time- and cost-saving characteristics of computer-generated visuals, opposed to original artwork, that make computer graphics a viable alternative. This paper focuses on parts of the computer graphics system in use at the Los Alamos National Laboratory to provide specific examples.

INTRODUCTION

Computer-generated images, such as in the movie "TRON," are becoming commonplace. The limitation in such films is that, although an artist did the design work, a programmer generated the image on the computer. It's rather like Picasso telling a scientist how he wants his painting to look upon completion; something is lost in the translation. Although graphic artists are not expected to work at Picasso's level, they still need the freedom to produce their own work rather than have to work through an intermediary. To take their place in computer graphics, graphic artists will have to learn the tools for generating the end product themselves if they wish to exercise their creativity to the fullest.

This paper draws on my experience as a graphic artist at the Los Alamos National Laboratory where I use the centralized computer system to produce many different kinds of visuals. My discussion features the Los Alamos system because the specific details of how I interact with it will be more informative than generalizations about the different computer graphics systems in use today. The paper explores the capabilities of the system I use in terms of what I can do on it, how much time and effort it takes, what it costs, and how I decide whether to draw a visual manually or generate it by computer.

This paper is for graphic artists who are curious about computer graphics and the images it can create, but who do not wish to learn programming. The point of view presented is that of the graphic artist, a nonspecialist in computerland, who has learned to use a sophisticated computer graphics system to do her job.

USABLE SOFTWARE FOR THE GRAPHIC ARTIST

The capabilities of any computer graphics system depend on the type of equipment (hardware) and the graphics package (software) available to the user. The computer need not be large to support a powerful graphics package.

Today's graphic artists, with no knowledge of computers, can use a computer to generate dynamic visuals because of recent advances in software designed specifically for artists. No longer dependent on an intermediary, graphic artists can directly apply their instinctive and personal touch to their computer-generated work. Among the artist-oriented computer graphics systems on the market are the Genigraphics System and many of the CAD-CAM systems, as well as graphics packages that run on any number of small computers.

Other computer graphics systems have been adapted for use by nonprogrammers, such as the one that I use. The gigantic system at Los Alamos was not originally intended for computer graphics work. That capability was added later to permit scientists to view the results of their complex calculations in graphic form rather than as an amorphous mass of numbers. In the last few years the Los Alamos system has been made more accessible to people without a rigorous programming background, mainly with the inclusion of the MAPPER graphics package.*

MAPPER, which was originally created at Los Alamos to generate maps, now is extensively used here (and at many other installations) by nonprogrammers to produce word visuals and line charts. The Los Alamos graphics system has no provision for direct drawing with a lightpen on a screen. To produce line art, the user enters the x,y coordinates that define lines and curves and the computer connects the points. Alternatively, the user can enter graphic information into the computer by digitizing a drawing.

My background as a graphic artist does not include the programming expertise to take full advantage of the more complex graphics packages, such as DISSPLA,** that are available on the Los Alamos system. I use MAPPER, the less esoteric parts of DISSPLA, and a few other graphics packages to generate visuals. Is it possible for a graphic artist to function, much less be creative on what appears to be such a cumbersome system? Yes, indeed. Once you get used to working within the constraints, your imagination can soar.

---

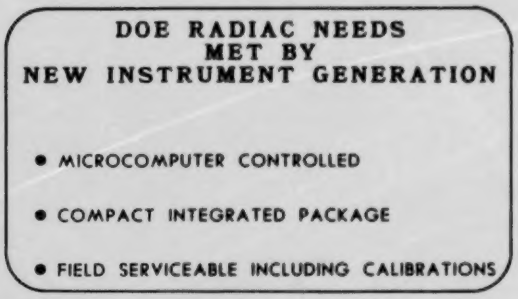
*Its creator, David Dahl, spoke about MAPPER at the 28th ITCC in Pittsburgh in May 1981.

**Integrated Software Systems Corporation, San Diego, California.

COMPUTER CAPABILITIES AVAILABLE TO THE GRAPHIC ARTIST AT LOS ALAMOS

Considering the constraints of the graphics system I work with, what can I do on it? Just about everything: numbers and letters of infinite size and shape, thick and thin lines, bars for bar charts, wedges for pie charts, smooth curves, closed forms, shading, shadows that put shapes in relief—everything except cartooning, which can be done more quickly by hand, and continuous-tone photographs.

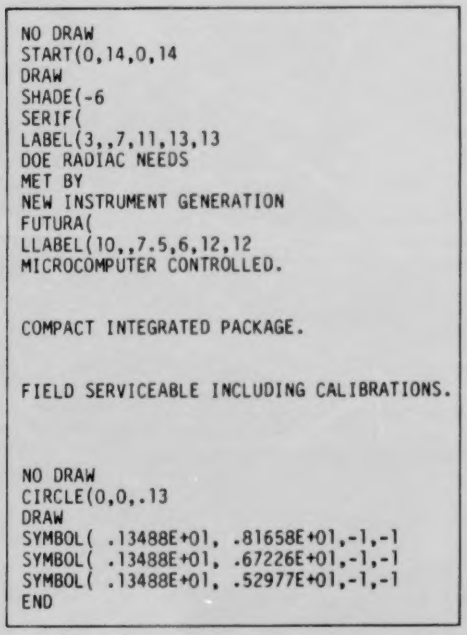
My terminal, a keyboard/display Tektronix 4015 graphics unit with attached devices for digitized input and B&W hardcopy output, is connected to the central computer system. The visuals I generate at the terminal are primarily 35-mm color slides for presentations, although I also do computer graphics for technical exhibits and for publications. Figures 1-7 present examples of the simpler color visuals I generate that lend themselves to B&W reproduction.



DOE RADIAC NEEDS
MET BY
NEW INSTRUMENT GENERATION

- MICROCOMPUTER CONTROLLED
- COMPACT INTEGRATED PACKAGE
- FIELD SERVICEABLE INCLUDING CALIBRATIONS

Figure 1.
To lay out a text slide, I specify the center of the window (the screen area) that I plan to use, its size, the number of lines of text (including blanks), and whether or not the text is to be centered or right or left justified. Note the change in text style.



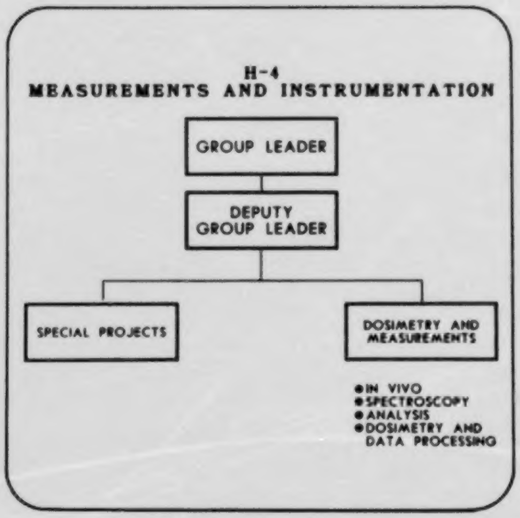
```
NO DRAW
START(0,14,0,14
DRAW
SHADE(-6
SERIF(
LABEL(3,,7,11,13,13
DOE RADIAC NEEDS
MET BY
NEW INSTRUMENT GENERATION
FUTURA(
LLABEL(10,,7.5,6,12,12
MICROCOMPUTER CONTROLLED.


COMPACT INTEGRATED PACKAGE.


FIELD SERVICEABLE INCLUDING CALIBRATIONS.



NO DRAW
CIRCLE(0,0,.13
DRAW
SYMBOL( .13488E+01, .81658E+01,-1,-1
SYMBOL( .13488E+01, .67226E+01,-1,-1
SYMBOL( .13488E+01, .52977E+01,-1,-1
END
```



H-4
MEASUREMENTS AND INSTRUMENTATION

GROUP LEADER

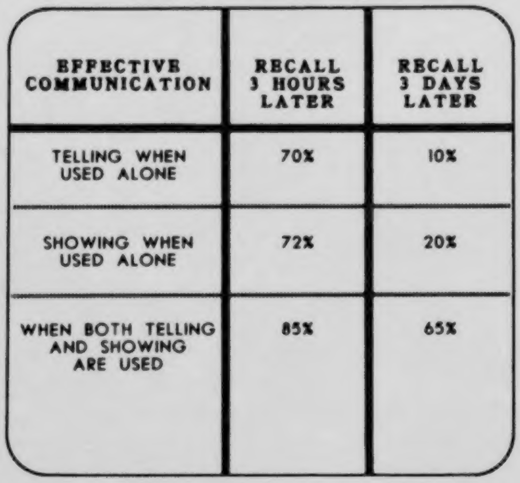
DEPUTY GROUP LEADER

SPECIAL PROJECTS

DOSIMETRY AND MEASUREMENTS

- IN VIVO
- SPECTROSCOPY
- ANALYSIS
- DOSIMETRY AND DATA PROCESSING

Figure 3.
To generate an organization chart I draw all the boxes to size and locate their centers on a piece of graph paper. Once that information is in the computer, I key in the text to go in each box and specify what size I want the text to be. On my display screen an image appears of the boxes and text as they will look on the final slide. To add the lines connecting the boxes I call up a graphics editor (MAPEDIT) that allows me to move a cross-hair cursor on the screen to locate the points that specify the connecting lines that I want drawn. MAPEDIT draws those lines on the screen.



EFFECTIVE COMMUNICATION	RECALL 3 HOURS LATER	RECALL 3 DAYS LATER
TELLING WHEN USED ALONE	70%	10%
SHOWING WHEN USED ALONE	72%	20%
WHEN BOTH TELLING AND SHOWING ARE USED	85%	65%

Figure 4.
To generate a table, I break it down into a series of boxes containing text with a certain number of lines plus blanks. I specify the label centers and the text to fill each area.

← Figure 2.
MAPPER code that produced the text slide in Figure 1. To specify the window area of my visual I define a box but request that it not be drawn. I specify shaded, serif type to be centered at the top of the visual. Then I change the font to Futura and specify that the rest of the text be left justified. To generate the bullets, I use the cross-hair cursor on the screen and specify where I want the shaded circles.

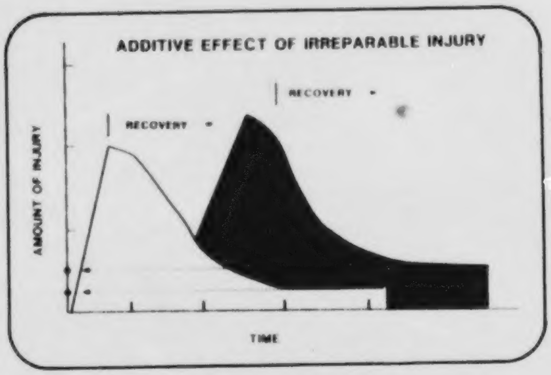


Figure 5.
To generate a graph, I tell the computer where in the window I want the graph situated. Then I specify how heavy the frame lines are to be; what scale to use; whether I want tick marks inside, outside, or not at all; what numbers to place by those marks; and how to label the axes. Next I enter the x,y coordinates of all the points on the curve, tell the computer to connect those points, and then to smooth the connecting line. To shade the areas under the curves, I must specify the entire closed shape and select the color to fill in the area.

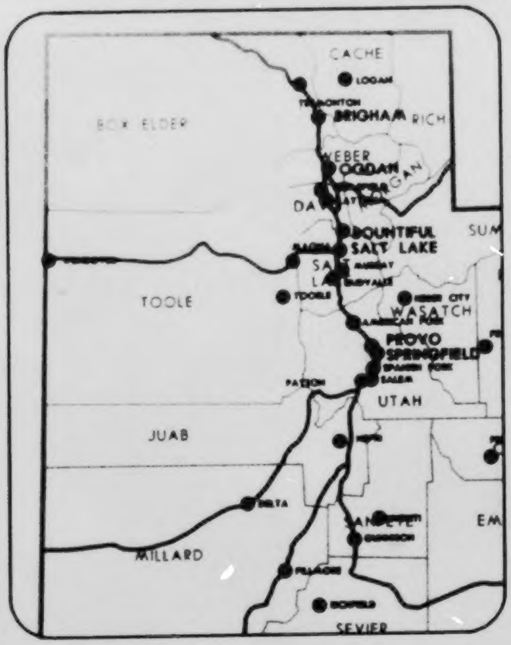


Figure 6.
Maps require accuracy and a lot of detail. The best way to enter such information into the computer is to place the map on an input device called a tablet and digitize it by passing a mouse over the points that are to be entered. The mouse has cross-hairs that permit accurate entry of points. (The pen provided with the tablet is less accurate than the mouse.) On this enlarged section of the state of Utah I have highlighted important highways and cities. Only the boundary lines were digitized—I keyed in the city names and dots for their location.

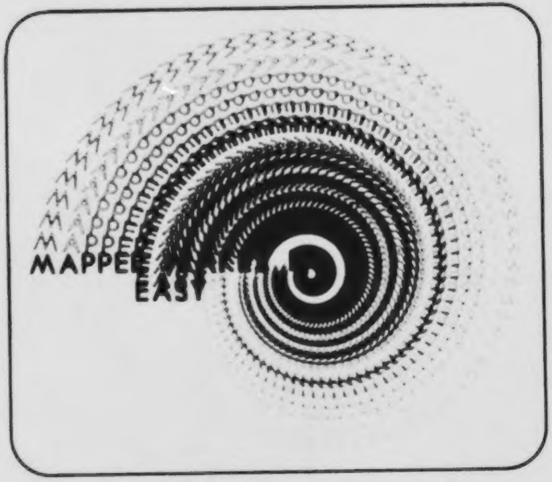


Figure 7.
Text animation within one frame can create interesting effects. The image can be made to zoom in from the background or spin or leave a trail. To create such effects with text or geometric shapes I call on the ANIMATE program. I specify whether I want to rotate the text in a circle or spiral; move it up and down, sideways, or at an angle; or zoom it in from some disappearing point. Because of the way film is exposed from dark to light, I have to consider the amount of burn I want to occur on the film. I use a hollow font style with a very low color intensity, knowing that the overlapping lettering will lighten up the film and increase color intensity. Animating text can provide very interesting patterns and shadings.

ADVANTAGES OF WORKING WITH COMPUTER GRAPHICS

Using computer graphics to generate a visual image instead of doing it manually has several advantages. Speed certainly is the primary advantage, especially when the end product coincides with the computer's standard output. At Los Alamos the standard output is 35-mm slides, which I can usually obtain 24 hours after generating the visuals at my terminal. The element of speed comes in

- being able to call up a basic format, such as axes for a graph, without having to repeat all the data;
- when I need several slide copies of a visual; or
- by simply avoiding the photography process involved with original art.

Speed is not a factor, however, for keyboard entry of complex visuals into the computer. Entering the information can take as long as drawing the final visual in ink, especially if it's a question of complex artwork.

Ease of manipulating forms once they are defined in computer memory is another advantage of computer graphics. For example, to manipulate a form I can use an animation program to selectively shade the form from light to dark, move that form anywhere within one frame or over several frames, rotate it, size it up or down, do a mirror image of it, or distort it. The ANIMATE program allows me to generate complex slide shows that would take weeks or months to produce manually with original art.

Yet another advantage of computer graphics is the number of type fonts and alphabets available and the ease with which they can be laid out inside a frame. Computer graphics permits you to animate type, shade it, center it, and distort it much more quickly and easily than you can manually. Another plus: computer type styles project extremely well on a screen.

Dynamic colors are certainly an impressive advantage of computer graphics. Because the color is produced directly onto the film, there is little color saturation loss, which normally occurs on color copies made in a photo lab. Color intensity and saturation, metallic and neon effects, shadings from light to dark, including the grey scales, can all be computer-generated. The closest art medium produced by hand that resembles such effects and maintains color intensity is airbrush work. The disadvantage, however, is that airbrushing costs a lot to produce.

WHETHER OR NOT TO USE THE COMPUTER

I work with 25 scientists who rely on me to put together presentations that sell their technical ideas to many different audiences: administrators, equipment manufacturers, and scientific colleagues. The lead time that they give me to develop visuals for their presentations varies from one day to several months. Sometimes their presentations incorporate material from former presentations; sometimes the material is entirely new. The preferred end product is 35-mm slides, which are lightweight and compact for taking on trips.

Even though I can do just about any visual on the Los Alamos graphics system, I don't. Sometimes it makes more sense to do some visuals manually. My decision takes into consideration five factors.

- **Deadline.** Is there sufficient time to do the visual by computer or must I do it by hand? After I finish drawing a set of computer graphics at my terminal I wait 24 hours for the 35-mm slides; viewgraphs and glossy prints, which are made from the slides, can take a week.

- **Cost.** Which method is more cost-effective? For example, if I have to make more than one copy of a slide presentation, it is certainly far less expensive to generate duplicate copies of computer files rather than have slides reproduced photographically.

- **Complexity.** Will a complex drawing, or parts of it, be reused for another purpose? If the drawing is only for one time use, it is more efficient to draw it manually. This is because it requires a lot of time to enter complex artwork into the computer. If the artwork will be used repeatedly, the time required to enter it is worthwhile.

- **End Product.** What is the final form of output: slides, viewgraphs, color or B&W prints? At present, the computer-controlled camera at Los Alamos generates 35-mm slides. To make viewgraphs or prints, the slides must be sent through the photo lab. To save time, I make color-overlaid viewgraphs by the Ozalid process.

- **Visual Effect.** How formal is the presentation? Is it highly technical and straightlaced? Or can it incorporate cartoons and other more light-hearted visuals? Those decisions depend on the audience and the personality of the speaker. For example, I can generate a serious technical presentation containing text and graph slides entirely on the computer. However, for a less formal talk that includes cartoons, I use the computer to generate the text and graphs as before but then include manually drawn cartoons. To blend the two parts of the presentation, I use a unifying color scheme.

COST COMPARISON

Every computer graphics system incurs costs in ways that are not always directly charged to the user. For example, at Los Alamos the extensive network of computers and software systems are paid for out of a different budget than my own. I simply pay to use the system and all its affiliated services. You may be wondering what it costs for me to work with a computer instead of with more traditional methods.

TABLE
COST COMPARISON FOR PRODUCING A GRAPH[a]

Charges	Illustrations B&W	Illustrations Color	Computer Graphics B&W	Computer Graphics Color
	Print			
Labor	$22.50	$22.50	—	$ 5.75
Materials	9.00	22.20	—	4.50
Computer	0	0	—	1.25
Total cost	$31.50	$44.70	—	$11.50
	Transparency			
Labor	$22.50	$22.50	—	$ 5.75
Materials	13.00	26.10	—	7.50
Computer	0	0	—	1.25
Total cost	$35.50	$48.60	—	$14.50
	35-mm Slide			
Labor	$22.50	$22.50	$5.75	$5.75
Materials	5.65	5.80	0	0
Computer	0	0	1.25	1.25
Total cost	$28.15	$28.30	$7.00	$7.00

[a] These costs are based on 45 minutes for a graphic artist to draw a graph at $30/hour and a data analyst to generate a graph in 15 minutes at $28/hour ($23/hour labor and $5/hour computing time).

At this time, the Technical Illustration Group at Los Alamos does not use computer graphics. However, the Los Alamos Computing Division does provide a computer graphics service. The computer graphics personnel have no art background; they originally were trained as programmers, data analysts, or word processors. The Table compares the charges both groups make for comparable work. Computer graphics is by far the less expensive way to go. To give you an idea of the costs I incur, my average monthly computing charge is $500 plus another $200 for running film, file storage, and file transfer within the main computing network.

CONCLUSION

While computer graphics approaches recognition and acceptance as a valid art medium, two prejudices remain to be overcome. One is that programmers who provide the tools for using computer graphics need to accept the entry of the graphic artist into their wonderland. Without being a programming expert, the graphic artist can master those tools to create new forms of expression, much as a violinist masters the instrument without learning to build or repair it. The other prejudice to be overcome is the technological intimidation that graphic artists feel toward this new art medium. Once they accept computer graphics on the same basis as oils and watercolors, then they can expand their visual expression within the world of art.

ACKNOWLEDGMENTS

I thank my colleague Dorothy Amsden for her help and expertise in the production of this paper. Her talents as a writer and editor were an invaluable aid. I also thank Barbara Edwards for suggesting changes that make this paper more comprehensible to my audience.

HOLOGRAPHY IN TECHNICAL COMMUNICATION

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Holography is emerging as an effective tool in technical communication. The three-dimensional character of holograms provides a more realistic representation of an object than does photographs or line drawings. As more people become aware of holography, this media will take its place with photography and line drawings in providing accurate technical communication.

Holography is a new technology now available to technical communicators. Through holography, writers and graphic artists can communicate with their audiences in three-dimensional graphics, a form of communication superior to line drawings and photographs.

Since holography is a new technology in the graphic arts, I shall begin this discussion of its application with a short explanation of the phenomenon. The process of making a hologram is called construction and the method of showing the hologram is termed reconstruction. Figure 1 shows one simple arrangement for constructing a hologram. The light from a coherent light source, a laser, is spread and then divided by a beam splitter. The two resultant beams are redirected by front surface mirrors. One beam of light is called the illuminating beam and illuminates the object to be holographed. The object reflects part of the illuminating beam onto the film. This reflected portion of the illuminating beam is called the object beam. The second beam of light leaving the beam splitter is called the reference beam and is directed to the film. On the film, the object and reference beams interfere with each other, and the interference pattern is recorded on the film as a microscopic pattern. When developed like an ordinary photographic negative, the hologram appears essentially transparent. Note that the hologram is the microscopic interference pattern. There is no need for film. The interference pattern could be recorded in a photo resist, for example, and that used as a master for impressing holograms in plastic sheets. Many different types of holograms can be made and the construction set-up above is for a common type of hologram.

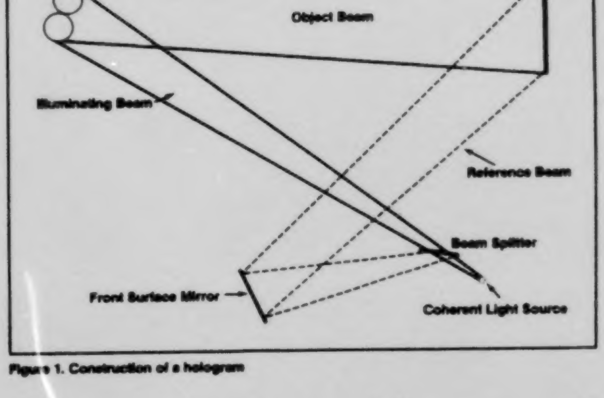

Figure 1. Construction of a hologram

In reconstruction, the object is recreated by directing a beam of light onto the film. The light need not be laser light. It can be normal room light, depending on how the hologram was constructed. One important attribute of holograms when reconstructed is that all the information is on each portion of it. Thus, it can be severely damaged, for instance half cut away, and one can still see the entire object holographed with no loss of resolution.

In technical communication, holograms provide the most accurate representation of an object because the observer sees the actual light waves from the object. One can even look around an object by moving one's head just as though one were looking at the actual object. The use of holography in technical communication spans any area in which graphic information about objects or models of objects must be communicated. Most important, it allows presentations which would not otherwise be attempted. The use of holograms can also save space since in many applications one can present in one hologram what would otherwise require multiple photographs for clarity. An example of this use is in the communication of information with holographic terrain maps as substitutes for either sand tables or contour line maps. Another example is holograms in place of exploded view line drawings.

In a study published in 1978, data obtained from people performing job-related tasks showed that holograms were superior to photographs and line drawings in assembly tasks. In fact, holograms can replace and exceed the utility of line drawings and photographs for any object or model of an object, as well as making possible presentations hitherto not possible.

Another relevant aspect of holography is its use for high density storage of man readable information. For example, the entire 30 volume set of the Encyclopaedia Britannica can be stored holographically on the equivalent of ten microfiche cards. Classified and unclassified information can be intermixed. All readers can read the unclassified information but only those readers with the appropriate decoder (another hologram put in the read-out beam) can read the classified material.

The technology of holography is available for use in technical communication, but few people are aware of its advantages. As more people become familiar with holography, holograms will eventually take their place with photographs and line drawings. The result will be more effective technical communication.

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INTERNATIONAL PROPOSALS: BREAKING THE LANGUAGE BARRIER WITH GRAPHICS

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The challenge begins after the "go" decision has been made on a proposal to an international client. Overseas proposals give the technical communicator a chance to use all of his/her talents in creating a visual proposal that will sell a product or a service. Before an international proposal is begun, the proposal team must be fully knowledgeable of the client's needs as well as his cultural background. Since the majority of proposals produced in the United States are written in English, graphics are of great importance because of the language barrier. The prospective client must first understand the proposal before he can award the contract to you. On the other hand, you must be able to communicate with the client without giving him the impression that you are talking "down" to him. This paper offers suggestions on producing a proposal to the international client by breaking the language barrier with graphics, as well as tips on producing covers, cover letters, executive summaries, resumes, and experience.

1.0 INTRODUCTION

Because of the suppressed market today in the United States, many American consulting firms are appealing to the international market. When dealing with international proposals, the cliche, "You've got to spend money to make money," becomes a reality. Therefore, the decision to bid on an international project requires careful consideration. According to Lucas (1982), "In most organizations, the job of selling your own management [to the idea of international marketing] and getting long-term commitment to the marketing budget will make a grueling visit to Abu Dhabi or Benghazi seem like two weeks at the Greenbriar."

Most international agencies require prior approval of a company's qualifications before issuing a Request for Proposal (RFP). An application must be obtained from the agency and completed by the bidding company. Companies with approved qualifications will be placed on a bidder's list. Extensive resources can be devoted to achieving a spot on this list. For example, producing these applications may require as much research and effort as extensive proposals.

The decision of "go" or "no go" on an international proposal should be made only after your company's principals have weighed all the factors involved in international marketing and have decided to support the long-term effort. Once the "go" decision has been made the challenge begins. The following sections offer suggestions on proposal preparation to an international client and emphasize the importance of using graphics to "Break the Language Barrier."

2.0 KNOW YOUR CLIENT

What do you know about your client? Before attempting to write your proposal, research your client and his culture and find out as much as you can about him. According to Van Zandt, "International businessmen, no matter where sent, normally find that their accomplishments and personal contentment are in direct proportion to the amount of time they give to the studying of the foreign country in which they work. The ambitious ones, therefore, devote a substantial part of their spare time to learning about the history, geography, language, politics, economy, customs, and manners of the host country."

The amount of time spent on research will vary, depending on time constraints the client has given you to respond to his RFP. Key questions that require answers are:

1. Why is this client requesting your response to his RFP? He may be dissatisfied with his present consultant, or happy with his present consultant's work, but just wants to check prices. The answers to these questions are essential to avoid wasting your time and money responding to an RFP that will never be funded or is definitely marked for another firm.

2. If you have determined that the client really needs a consultant, do you have the appropriate experience required to perform the proposed project? Do you have experience in the host country or nearby countries? If not, do other competing firms have this experience? Who will be your competitors, and to what length will they go to get this

project? Are you in a good location to perform the work? Do you have the appropriate personnel on staff? Will you need subcontractors, and if so, do they have to be approved by the client prior to contract award?

3. Who are the client's decision makers? Are they technical personnel or contract administrators? What is their age group? Do they speak fluent English? Are women prohibited to work on the project site? These answers will be important to consider when writing your proposal. For example, if the client is Middle Eastern and the project site does not have facilities to house women, do not propose to use women on your project team.

4. Has the client established a dollar value for the contract? Is your firm cost competitive?

5. What is the potential for repeat business? If this RFP will be followed by a second or third RFP, it is worthwhile to spend extra time and money in producing your proposal. With more than 80 percent of our business at ESE being repeat, we have found that a satisfied client usually would prefer to conduct business with the same consulting firm rather than advertising to other firms for subsequent contracts.

Finding answers to these questions is not an easy task. The most economical way to research your potential client is to engage into a contract with an agent in the host country. According to Kustenbaum (1981), "Firms will find that choosing an agent...can be the most important decision in successfully doing business [internationally], even though their use is not required in every [country]. Agents can serve a variety of vital functions.... An active agent can represent the foreign firm's products or services with the many ministries of the federal government.... A reputable...agent will provide the foreign firm with a good standing in the local business commmunity, can provide logistical support (such as transportation, hotel accomodations, visas, work permits, and appointments with the proper government officials) and can work to develop trade leads or contract opportunities."

You must supply your agent with appropraite materials which effectively present your company's capabilities. Materials should include slide shows, picture view books, brochures, pictures, as well as the traditional experience listings, project profiles, and resumes. Do not assume that your existing materials are okay. Critically evaluate each item: 1) Do the pictures tell a story? 2) Are your employees appropriately dressed in the pictures? and 3) Do the materials clearly show that your firm has an international flavor, i.e., do you show knowledge of foreign customs and familiarity with projects relevant to their needs?

A firm must be extremely cautious if engaging into a contract with an agent. All such contracts should be carefully reviewed by the firm's legal counsel, because breaking an agency agreement can be difficult and costly. Before signing an agent agreement, check to ensure that he is not also representing your competitors or has other conflicts of interest.

3.0 PROPOSAL CONTENT

Topics that should be addressed in all proposals include scope of work, experience, project management team, and cost. The placement order of these topics will depend on the importance of their subject to the client, as reflected by the evaluation criteria and verified through discussions with the client and your agent.

While the bulk of international RFPs are written differently, all have some similarities. A well-written RFP will include submission requirements and evaluation criteria with weighted points. These RFPs should be self explanatory, but many are confusing and should be clarified by the client. Since the client is in another country, communication can be difficult. This is where your agent becomes a valuable asset to you. After reviewing the RFP, a list of questions should be given to your agent for clarification by the client. In a recent proposal to the Saudi Ports Authority, we were required to submit our response in Arabic as well as English. After responding in English, we gave our agent the task of translating it into Arabic.

The following sections discuss contents of a proposal where graphics can be used to assist the client in understanding your proposal.

3.1 Cover

The cover of your proposal can give the client his initial impression of the quality of your proposal and subsequent project work. Since competition on international proposals is just as great or greater than domestic proposals, much thought and strategy should be given to the illustration of the cover. Proposal covers can vary from elaborate, 4-color covers to preprinted window box covers. We believe that an international client may evaluate us more favorably if a cover has been custom designed. The use of client logos, or pictures of the client's facilities or contract site have proved to be successful. For example, in a proposal produced for a client in Abu Dhabi, we used a cover with a picture of the Arabian Gulf (the site where the project was to be conducted). Remember, however, before using a picture from a foreign country to ensure that it is legal for you to use the picture. Photography in certain countries is illegal because of security reasons. The client may be angry that you have the picture in the first place, rather than pleased with the cover. Discretion is advised.

3.2 Transmittal Letter

The transmittal letter should be concise; however, take this opportunity to tell your client why your firm is uniquely qualified to perform the proposed project. Some international RFPs require that the transmittal letter, as well as all contractual information, be translated into their native language, as well as English. If you cannot rely upon your agent to assist you in this translation, we have found that using a foreign student at a local university for this service works well.

3.3 Executive Summary

We believe that the executive summary is one of the most important elements of our proposals. This is the place to tell the client why your firm should be selected over your competitors. In this section, you should give a short synopsis of related work experience and proven project management techniques as well as emphasizing your firm's strengths. This is a good place to insert pictures of previous experience in the area of the proposed project. It also may be a good idea to have this section translated into the native language since these are the key points of your proposal.

It is important to remember when writing your executive summary that some evaluators may not read past this section, so you want to give them information that will make them want to read further in your proposal.

3.4 Introduction and Technical Approach

This section should be used to: 1) restate the client's problem as you perceive it, and 2) state the methods that will be used to solve the problem. If a picture of the project site is not available, insert a graphic illustrating the general area where the work is proposed. A schedule bar chart, including milestones, also should be included in this section. This chart will show the client that his project will be completed on schedule and shows him important meeting dates and document delivery dates. Don't skimp on this section. This is your opportunity to make the client believe that you know what to do to solve his problem and that your company can do it more efficiently than your competitors. Include example graphics from other projects, sketches of equipment and carefully plan to lead the readers eye through the whole section. Since there may be a language difference between you and your client, do not use a lot of unnecessary verbage through which the client will have to struggle. However, do not talk down to your clients. Many of them have PhDs from the United States, and those that do not will not appreciate you thinking that Americans were born with all the brains (Lucas, 1982). This is where pictures and graphics come into play. When you have explained how you will conduct a project, interject diagrams showing special equipment you will be using and/or flow diagrams of how the system will work.

3.5 Experience

The client will want to know about similar experience you have previously performed. In addition, he may want to know any experience your firm has in the host country. Again, if a language barrier exists, pages and pages of experience listings can become cumbersome to someone who speaks English as a second or third language. In this case, give a short, concise narrative description of previous experience, followed by a picture or illustration of members of the project team conducting these projects. At ESE, project members are encouraged to carry a camera when in the field working on projects, for this reason. Then pictures are stored in a library for use in later proposals. If your company does not have such a library, pictures may have to be staged. Again, because of security reasons, pictures of foreign projects may be illegal, so therefore get permission from your client before using pictures of his project site.

3.6 Project Management

In a large multidisciplinary project, management is the most important facet. This section should reflect your strong management approach in addition to introducing your proposed management team. A graphic illustrating the proposed project management team and the reporting hierarchy should be included in this section. Remember that proposals can be won or lost by the persons you propose as your Project Director and Project Manager.

3.7 Resumes

Resumes should be limited to one page, unless specified differently by the RFP. These one-page resumes should be slanted to include only experience relevant to that person's role in the proposed project. Don't waste valuable space on personal information. Instead, get right into what the person will be doing on the project and what unique qualifications he/she brings to the effort. While an international client may be interested in hiring mostly single men for an overseas project, you do not have to tell the client the sex or marital status of your proposed project team members, unless it is a requirement of the RFP.

Academic background is important, but secondary to a person's qualifications and past experience. Therefore, degrees and professional registrations are listed at the bottom of the resumes. In some cases, such as a research project, the client may place high priority on publications of the project team. If this is the case, longer resumes should be included with listings of publications.

While pictures and graphics are important in most other sections of the proposal, at ESE we believe that a resume picture could only hurt and rarely help our chances in award for a contract. When dealing with clients, international or domestic, it is hard to know the unconscious likes or dislikes of a client. For example, our firm currently employs relatively young engineers and scientists, with the average age being about 35. Obviously, this isn't one of our greatest assets if we are proposing to a client whose decision makers believe that knowledge comes from gray hair. Many companies have a policy set on using or not using picture resumes. It is not likely that management will change this format for an international or domestic client.

4.0 SUMMARY

The key to successful international marketing is flexibility. Any company's capabilities and experience can be adapted in many ways to meet the changing needs of a client. Since the United States has an impressive reputation for consulting, architectural, and engineering and planning services, and is looked upon in the Middle East and other parts of the world as the supplier of the highest quality products and services, many companies are exploring the possibilities of a new areas of business. The use of graphics in proposals can help break the language barrier and enable Americans to communicate their technology to all parts of the world.

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WINNING CONTRACTS GRAPHICALLY

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ABSTRACT

Every business should have a strategy. Given that strategy is the necessary basis for a plan aimed at achieving goals, its importance is obvious. This paper will discuss the careful planning and strategy involved in implementing a presentation as well as the importance of using effective graphics. Focus will be on the basic needs to prepare for the presentation using proven marketing methods. Visual attractiveness and graphic display are key factors to providing audience involvement and stimulation. The listener must also be assured that the product or service being promoted will be provided cost-effectively, within budget, and on time. This paper will discuss some of the many methods and materials that can be used.

INTRODUCTION

The best way to present an idea vividly and to communicate a point is through a picture. A picture displays an idea quicker, clearer, and more vividly than any other means of communication and in marketing, graphics can mean the difference between winning and losing a contract.

This technique of using visual aids as a pictorial presentation of an idea or situation used by the speaker is effective because it looks more like the idea than words or numbers can express, reports Hurst (1933).

According to Brinton (1914), daily we see facts presented in the hope of creating interest and action for some really worthy piece of work to benefit the people as a whole. In many of these cases, the attitude of the person presenting the material seems to be that the facts will speak for themselves and that they need little or no assistance. Ordinarily facts do not speak for themselves. When they do speak for themselves, the wrong conclusions are often drawn from them. Unless facts are presented in a clear and interesting manner, they are about as effective as a television without the picture tube.

There would be a great increase in the use of graphic methods of presentation if more speakers realized the method used to present the facts is often more important than the facts themselves. Unlimited numbers of reports, magazines, and newspapers produce reams of quantitative facts. If the facts were presented in graphic form not only would the reader's time be saved, but more facts could be absorbed with less danger of misinterpretation. Graphic methods usually require no more space than written methods. Brinton (1914) reports that, in many cases, the graphic method requires less space than words. Therefore, the great advantage with graphic methods is that facts are presented in a way that encourages the reader to make deductions on his/her own; when words are the means of communication, the reader must usually accept the ready-made conclusions handed to him/her.

PRESENTATION PREPARATION

Four helpful techniques for using visual aids which can enhance rather than detract from a presentation include:

1. Preparing in advance to ensure that all equipment is set up and functioning properly,
2. Using color,
3. Designing effective visuals, and
4. Providing handouts.

First, the speaker must never be in the dark, not even when slides and films are being shown, according to Snell (1962). The visual presentation supports what the speaker is attempting to develop or prove. Removing light from the speaker immediately reduces his/her authority. Even a small light on the speaker during a visual presentation requiring complete darkness keeps the focus on the speaker.

Before the presentation, make sure all visual aids can be seen clearly from the back of the room, otherwise the speaker will be wasting speaking and listening time. A right-handed speaker usually stands to the left of the visual aid and directs the attention of the audience to his material. When using a pointer, one may stand on either side of the graphic; however, the speaker should never stand in front of the material. Thought should be given to the setup before arranging the materials; the graphic should be placed where it is most visible and where it can be used most effectively. Also, charts or graphs should not be posted on a wall behind the audience. Making the audience turn around or move to accommodate the setup is distracting and can be detrimental to overall effectiveness.

The atmosphere of the room should not inhibit the audience and cause listeners to be on the defense. On the other hand, the room should not be too casual as to relay a sense of compromise. Keeping the temperature of the room comfortably cool also helps to maintain the level of interest.

Memo

MEMO: *Speech-Makers*
FROM: *Your Audience*

I am the audience.

Today, I had to make time to sit and listen to you. So speak. Go ahead. But I want you to know this: I don't want you to waste my time.

I mean, these speeches are pleasant enough, but I've already heard most of them before.

O.K., here I am. What do you want to do this time? You want to show me a new product? You want to teach me what you know? You want to change my mind?

Then do it.

You see, I think a lot faster than you can speak, so my mind has a lot of free time to wander where it will. I want to respond to your speech. I want to get involved.

Why don't you also show me what you mean?

Don't just tell me how much better your company is. Show me. If I see a graph or a visual comparison, I'll remember your figures longer.

Show me how this product is used.

I am the audience. If I do choose to listen, I can also choose to forget as soon as I leave here. So, show me exactly what you mean.

After all, I'm only the audience.

Secondly, the role of the visual is a support function and should be integrated to support what the speaker has to say. If the speaker appears awkward or the visual material is cumbersome, the effectiveness in being perceived by the listener diminishes. Also the speaker should always direct the listener's eye to the "discussion" point on the visual and not just wave in the general direction of the visual. According to Kapp (1964), it is easier to tie a memory to a picture than to an idea.

The speech should always be directed toward the audience, not the inanimate graphic. The audience is the listener and its attention should be directed to the visual to amplify a specific point. The visual is an aid and should never replace the audience as the listener.

Thirdly, color use in graphics also plays an important role because it forces viewers to respond and is a vital facet that should be strongly considered as a selling tool. Visuals should also exemplify the point being made. Making the pictures and lines of diagrams and charts definite, broad, and clear conveys the feeling of strength and commitment to the speaker's ideas. Thinness and delicacy can be confused with artiness, willingness to compromise, and unwillingness to hold a stated position. The motive should be to make the audience believe what the speaker says is fact.

Fourthly, involving the audience by providing a handout listing subjects to be discussed can also be helpful. This may subliminally ask the listeners to participate by letting them formulate questions or comments pertaining to the appropriate upcoming topics, and also offer the speaker immediate feedback.

VISUAL AIDS AND THEIR ROLE

Visuals can mean the difference between the success or failure of a presentation. Many graphics look great when they are produced but turn out to be less than functional in a large room. Attention must be given to using large, bold type on charts and graphs and reducing the level of detail, as well as using only key words instead of complete sentences. Wordy and detailed graphics confuse the audience and cause loss of interest. Color use in graphics is an attractive feature and helps to emphasize the speaker's point of reference.

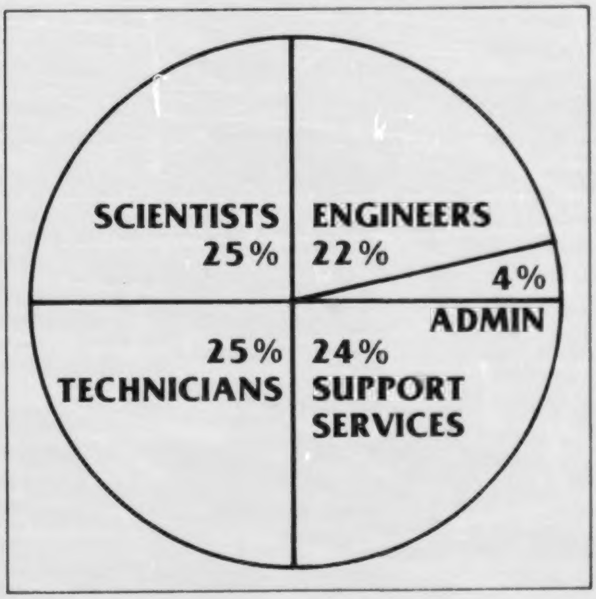

Figure 1. Diagram Example

The use of movies or slides is the best way to show the audience exactly what the presentation is all about. Movies are perfect to visually present or support the theme of a meeting. Slides are good for a point-by-point speech. According to Woolman (1982), a slide should be on the screen long enough to support the point, but not so long as to become tiresome. "If you have quite a lot to say, use different angles of the subject...to keep the audience visually interested. Estimate the number of slides needed by timing the speech and multiplying the minutes by five...to calculate approximately one slide change every 10 to 12 seconds" says Woolman (1982). Slides should be tested during a dry run to make sure they are in correct sequence and none are upside down or backward.

When writing for visualized speeches, the speaker must think visually and write for the ear, according to Woolman (1982). The first step is to mentally formulate the idea to be expanded upon and then write a segment of narration to emphasize the visual idea. A picture is still worth a thousand words if the presentation is organized for the ear as well as the eye. Good speeches can be better--and seem shorter--when the visuals engage the audience.

Low-cost computer graphics can help to translate complicated data into easily understood charts and graphs. Producing graphics by computer is a timesaver, says Scannel (1982). Data are much more compelling when they are displayed graphically and can be rearranged into charts and graphs that are easy to comprehend. Producing graphics by hand can take several days whereas computer graphics take a matter of a few minutes. Low-cost computer graphics can be used to generate detailed charts and graphs for management presentations, monitor the rise and fall of interest rates, keep track of different money trends, or even produce simple maps. Computer graphics are useful because they display relationships quickly and simply.

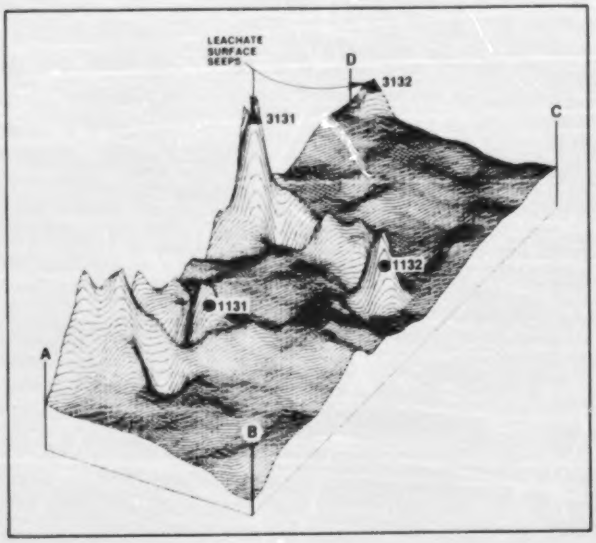

Figure 2. Example of Computer-Generated Graphic

Other visual aids that can be used are the blackboard, overhead projector, and exhibits. The blackboard allows the flexibility to immediately change ideas or the course of discussion. It is best to avoid using the overhead projector in large audience presentations as the enlarged lettering becomes fuzzy and, therefore, difficult to read. Exhibits, or tangible objects, are another means of keeping interest.

SUMMARY

Every business should have a strategy. Given that strategy is the necessary basis for a plan aimed at achieving goals, its importance is obvious. Visual attractiveness and graphic display are key factors that provide stimulation during what could be tedious presentations. One factor to consider is whether the graphic presentation can be produced within budget and on schedule.

There are many facets to using visual aids which can enhance instead of detract from a presentation. The reason for using a visual aid is simply to present an idea or fact in a form that the audience will quickly understand, which is as close to the real thing as possible, and which asks the listener to do as little translating as possible says Hurst (1933). Graphics can benefit the speaker as well as his/her audience and with proper use can prove to enhance communication, which is every communicator's goal.

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SCRIPTING THE INFORMATION FILM

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An information film script is a flexible planning guide that suggests in some detail a viable scheme for the solution of a communication problem—a scheme that optimizes the visual efficacy of motion media (kinetic audiovisuals). Within the context of this paper, "film" includes all forms of kinetic audiovisuals such as motion pictures, television, and video disks. Information films are produced for a host of diverse purposes—to train, inform, motivate, and sell. Inherently, however, the generic goal of all information films is to communicate messages to audiences so that in the future they will think or act in such a way that the film's specific communication objectives will be achieved.

INTRODUCTION

Writing per se is probably the least important component in scripting an information film. While important in its own right, writing clearly is subordinate to other critical scripting components. Failure to recognize and comprehend this fundamental principle often leads to the production of information films that do not achieve their communication goals.

In broad terms the information film is a communication tool with a specific purpose rather than a "film" or "movie." Palmer succinctly says, "The only conceptual kinship between a good (information) film and a 'movie' is the accident of being packaged on long narrow strips of cellulose acetate through which a beam of light shines." (1)

A successful information film is therefore one that achieves its communication goals. Information is securely implanted in the mind of the audience who reacts according to the film's message. And a successful information film is produced within the constraints of budgets and schedules.

To set a perspective, let's establish how the scripting of an information film fits into the overall production process. Films are traditionally produced in three distinct yet closely interrelated phases.

- Preproduction (scripting, production planning)
- Production (photography, sound recording)
- Postproduction (editing, dubbing, printing)

Normally then, scripting is part of the preproduction phase.

With many information films, the distinction between these phases blurs considerably. Phases may overlap, or some parts may be done concurrently or even in reverse order. Important points to be considered are (1) scripting does not have to be done first, although often desirable; (2) a script does not have to be a minutely detailed prescription for production; and (3) the script is not sacrosanct.

I recognize that to many these statements may be unorthodox. However, I contend that an information film script should be no more than a flexible guide—no matter how well conceived and detailed. A script must be mutable to meet varying requirements, new perspectives, and unforeseen difficulties, and to encourage industry and opportunism during production and postproduction.

In the production of medical and test-and-evaluation films, for example, the film designer cannot control the activities being photographed nor predict with any certainty the outcome. Success in producing these and many other films hinges on the film designer's innate ability, keen perception, and acute initiative during all phases of production. (I prefer the term "film designer" rather than scriptwriter or filmmaker because of its all-encompassing connotation of total responsibility in the filmmaking process) (2).

By and large, the film designer of successful information films identifies, analyzes, and resolves the key issues of all scripting components.

SCRIPTING COMPONENTS

Within my experience I've identified six discrete components that comprise the scripting function. The components are mutually related and interdependent and combine in an interlocking synergism to form the composite scripting function. The components are

- Communication analysis
- Research
- Client concerns
- Medium selection
- Filmic approach
- Writing

Each of these components, in turn, is composed of a number of key elements or issues. Regardless of when in the production process a script is completed, all issues would have been considered and resolved, which is essential if the communication role of the information film is to be fulfilled.

Communication Analysis

Among all the scripting components, communication analysis requires the most critical approach and detailed resolution. The entire scripting function is based on this communication analysis. In essence, communication analysis addresses the following basic issues:

- What are the communication goals?
- Who is the target audience? Secondary audience?
- What are the essential elements of information?

Only a few highlights of this complex topic are discussed as a detailed treatment is beyond the scope of this paper. The reader is encouraged to consult any number of publications that explore all facets of this subject; for instance, the book titled *Theories of Mass Communication* by Melvin L. DeFleur (3).

Communication Goals. By definition, information film is produced to solve problems in communication. The target audience is to act, think, or feel in some predefined way so that precisely defined goals are achieved. Goals are extensive and diverse, ranging from teaching to attitude and behavior modification. A surgical analysis of the communication problem usually pinpoints the definition of the goals.

In defining the goal, it is imperative that the real or fundamental problem be uncovered and understood. The real problem may not be the one the film designer is told it is or first concludes it to be. For example, if the goal of an information film is to motivate employees to work safely (specific employees in a specific place or environment) so that accidents are reduced by one-half in a week and to near zero within six months, the film designer must determine why the employees are not now working safely or why the safety levels need to be improved. Are the employees poorly trained in safety procedures? Is the inherent work environment unsafe? Are production demands incongruous with safety? Is the employee motivated to work safely?

Simply stated, exactly why is this film being produced? What precisely is expected of the target audience? The secondary audience? When? What level of satisfaction is required? How is satisfaction measured? Trenchant answers to these and other questions appropriate to each particular subject augur well for setting a solid foundation for the information film.

Since all the elements of communication analysis are intrinsically connected—combining to form a composite whole—defining communication goals cannot be isolated from the other elements. Rather, in practical terms, data on all elements are garnered concurrently and in the context of their interrelationship. It is nigh impossible, for instance, to define communication goals without identifying the target audience.

Target Audience. The most complex and demanding element is audience analysis—determining just who must be communicated with. What are the general and specific characteristics of the audience as a whole, and of the subgroups and individuals that make up the whole? Since composite audience profiles do not usually fit neatly defined parameters, answers must be couched in generalities and probabilities. That is, most large audiences are heterogeneous.

When communication goals are narrow and specific, I find that audiences tend to be more precisely defined or categorized—they become increasingly homogeneous. (I propose, however, that the only truly homogeneous audience is an audience of one individual.)

The social-categories theory of mass communication proffers the concept that people with similar social and psychological characteristics are influenced in similar ways when stimulated by messages in information film, or any mass communication medium. Accordingly, audience characteristics are classified into three broad categories so that their profiles may be readily drawn:

- Demographic—age, sex, health, geographic location, and marital status
- Socioeconomic—education, income, occupation, race or ethnic background and religion
- Psychological—intelligence, sophistication, emotional profile, responsibility, motivation, medium preference, film literacy, previous experience with the subject, and prejudice or predisposition toward the subject, client, film designer, or medium (4).

Clearly, no perfect audience profile can be drawn (nor is one needed); however, a reasonably close approximation can be made. To ensure optimum communication, the film designer couches the information film in a milieu (setting and tone) that is familiar, relevant, and sympathetic to the audience, thus engendering acceptance and empathy—the essential prerequisites to communication.

Essential Elements of Information. As the film designer carries out the communication analysis process, a few key points emerge that are of obvious import—the essential elements of information. Though not yet fully crystallized, it is apparent that these essential elements of information are the primary concepts the audience must have if film goals are to be achieved. Usually, in the form of broad-based notions or general guidelines, these elements form the basis for the script and direct the course of the research.

Research

Using the results of communication analysis as a guide, the film designer concentrates his/her research efforts on specific areas of interest, ferreting out that information that is germane and generally avoiding that which is superfluous. Information, garnered by this *directed* research approach is manageable, readily assimilated, and easily evaluated. Although not perfect, this austere approach is significantly more productive and cost-effective than the scatter-gun attempts I've seen all too often.

Research is essentially a fact-finding process and has no prescribed tenets. Anything goes and it should. Film designers consult a host of resources to gather the requisite information, both general and specific. It is imperative to keep an open mind so that unexpected discoveries of new key points and nuances may be recognized.

Printed materials and audiovisuals are excellent sources. Interviews with the client, technical consultant, and other involved personnel are essential and provide a bonanza of information. Importantly, interviews with ancillary people may give perceptive insight; for example, a dissatisfied customer. Personal experience, however, may be the most beneficial—visits to locales to see, hear, feel, touch, and smell the living scene (5). All options should be considered and explored.

Organization and evaluation of the information in terms of relevance and associations are the follow-through procedures. Organizational structure may be spatial, chronological, operational, or logical; or by critical area. As a rule, one structure usually evolves as the most propitious. Fact-finding is not yet complete, however. One needs to consider what the client's concerns are.

Client Concerns

Clients zealously strive to project and maintain a positive image. For some it may be their most important asset. They are particularly sensitive to images projected or perceived in mass communication media where negative interpretations are easily made and are hard to rectify.

Also of concern to clients are such sensitive issues as company policy, legal aspects, political implications, classified information, privileged and proprietary data or processes, and future goals (6). Though not directly related to image, these issues are often imperative elements in the client's communication policy.

It is therefore incumbent on the film designer to ascertain the particulars of all areas of concern to ensure that the script reflects a fitting client image, is inoffensive, and that only "releasable" information is included. Before the script is written, however, the appropriate medium must be selected.

Medium Selection

After goals, audience, and information have been pinpointed, the next component to consider is medium selection. Just how is the information to be packaged? What medium engenders optimum communication in the most cost-effective way? It is advisable to recall that a medium is composed of many parts. For example, the information film medium is composed of the program (the content of the film), projectionist and projection equipment, and the screening environment—all melded into an all-encompassing audiovisual (7).

Close liaison with the client is essential in this phase of the scripting function. A mutually agreeable decision on medium selection needs to be negotiated that considers the client's predilections and the film designer's professionalism.

The compelling logic that drives medium selection should be derived from the concepts of "medium advantage," "communication surround," and "controlling factors." I've coined these three terms to describe the all-encompassing communication environment—psychological and physical. These concepts are intimately related and inseparable in theory and practice. Nevertheless there are some intrinsic and discrete factors in each concept that can be discussed.

Medium advantage describes that unique overall psychological ambience that engenders optimum communication. Only one information system can create this unique ambience. An information system is formulated by integrating the many facets of each component into a medium. Different information systems can be formed by changing the medium, while the other scripting components (goal achievement, audience profile information package, and client concerns) are held constant. Of all the media, only one medium produces an information system with minimum entropy; that is, one system has the greatest potential for maximum communication. Therefore, *only one medium* has the communication advantage.

Communication surround describes the physical environment in which communication occurs. Elements of this environment vary considerably depending on the specific medium and audience size (large, small, or individual). Some of the elements are room size, appointments, acoustics, lighting (these same elements apply to carrels), equipment (such as projectors, screens, stands, and chalk), power, and noise. Also included are the number and frequency of exposures to the medium (screenings if it is an audiovisual), backup materials, and availability and qualifications of personnel needed to operate the equipment and to lead and monitor the audience.

Controlling factors are usually client-imposed conditions that are concerned with production and distribution. Some factors are budget, schedule, distribution scheme (where, when, how), technical constraints, and information obsolescence (8).

The potential of all media should be evaluated within the parameters of the three concepts during the medium selection process. Information film, multivisuals, individualized learning schemes, overhead transparencies, stand-up lecturers, and the printed word in all its variations are but some of the media examples. Each medium has its own special advantages and disadvantages. And each is best suited to specific applications (9).

The potential of a medium to facilitate communications is dependent on a host of complex factors. The properties of a medium or channel define its dimension; that is, the channel's overall communication effectiveness.

The following general dimensions or characteristics of a channel were suggested and codified by Rao in 1972 (10).

- Credibility—receiver perception of the expertise and honesty of the sender (encoder). In film this dimension is usually very high (especially in formal communications) regardless of the truth (reality) or fiction of its messages.
- Involvement—requirement for receiver involvement in the communication process; that is, receiver effort is needed to understand the message. Very low in film.
- Accessibility—availability of a channel to be used and the frequency it is used. Very high for film.
- Strength—ability to transmit quickly multiple messages over a geographic area. The larger the area, the more intense the strength is. Very high for film.
- Permanency—the time base of the channel, that is, its ability to maintain or reproduce original messages. Does not exist in film because its real-time messages are transitory. However, with readily available video recordings the character of this dimension is rapidly changing.
- Reinforcement—potential to augment other channels of communication. Very high in film.
- Feedback—a channel's ability, in terms of speed and depth, to transmit receiver response to the sender and to influence in real time the communication process. Very low for film. However, interactive cable video and some training schemes that provide student interaction are now coming into use on a limited scale.

Other dimensions to consider are

- Capacity—rate at which the channel transmits messages that are error free or nearly so.
- Coding—how messages are coded and decoded, their coded form, and the effort required (physical and psychological) to code and decode.
- Treatment—how the messages are presented in the channel in terms of emphases, redundancy, and style (clearly a writing function).

Thus the medium selection process is markedly more complicated than it appears to be at first glance.

Only a few examples can be mentioned within the constraints of this paper. The reader is encouraged to add his/her own examples—those that meet individual needs or preferences—as the possibilities are endless.

- The printed word may be appropriate for large, widely separated heterogeneous audiences that need general information quickly.
- If the goal is to teach a perceptual motor skill to a small homogeneous audience, perhaps an audiovisual is in order. If understanding of coordinated motion is required, an information film or video tape is appropriate.
- If the audience must learn a large amount of technical data or how to perform a complex series of events that must be done in sequence (field stripping an M-16 rifle, for example), communication may best be accomplished by instruction-proctored, interactive audiovisuals with follow-through by liberally illustrated backup printed material.

Admittedly, I've expanded the scope of this section of my paper far beyond the confines of the information film (kinetic audiovisuals) to emphasize the catholic character of this communication business and to urge the film designer to weigh all possibilities in medium selection. Based on sound judgement and keen professionalism, a viable decision is made.

Finally, it is of some concern that the information package (a formalized script, for example) is not yet complete. However, its general contents are known as are many details of the filmic approach—enough information to use in this medium selection process.

Filmic Approach

After the medium has been selected, the filmic approach establishing tenor, milieu, characteristics, and form is developed.

Tenor refers to the overall personality of the information film. Is it frank or subtle, serious or humorous, calm or excited, telling or asking, authoritative or dubitable (11)? Perhaps it is a combination of these qualities.

Milieu deals with the setting or environment—where and under what conditions does the scenario occur? Is the atmosphere of the information film real, fictional, or surreal? Dramatic, documentary, or cinema vérité? What are the composites of the cast?

Characteristics describe the production characteristics of the film. Will actors or real employees be used? Does cinematography include slow motion, time-lapse, micro-photography, or special effects? Is the film produced on location or on stage? Is stock footage used? Art and animation? How about sound—synchronous dialogue or voice-over narration, theatre of the mind, or stream of consciousness? Or some concoction of all these? What language is spoken? Stock or original music?

Form refers to physical structure of the film: length, gauge (8mm, 16mm, 35mm, 3/4-inch, or 1-inch); optical or magnetic sound track; black and white, or color. Is the film complete unto itself or is it serialized?

Some elements of filmic approach probably were decided upon as issues of the other components were resolved. The remaining elements are determined by combining communication and artistic skills.

It is imperative at this critical juncture in the scripting function that the film designer suppress those creative urges that compel us all to produce a "great" film—a creative masterpiece. A "great" film may be great, but the real question is, "Did the film do its job?" Were communication goals achieved? To me, these are the only criteria for a great or successful information film. Everything on the screen and the sound track must contribute in full measure to communication—all else is self-gratification at client expense. Information film need not be dull—far from it. Rather, I am suggesting that creativity be directed exclusively at achieving communication goals, not at ego massaging. To this end, a script that meets these critera is usually well-written.

Writing

Basically, script writing is combining the essential elements of information and the ancillary data into messages suited to the medium. Inherent in this synthesis is the comprehension and consideration of all scripting components (communication analysis, research, client concerns, and filmic approach) used in the selection of the medium.

There is no one method of script writing. Nor is there any one "right" structure or style. Each script is written to meet the unique situation described by the components. There is no panacea. Perception, flexibility, and communication skills are the professional attributes that bode well for success.

Within my experience, I've found a four-step writing method that best fits my needs.

- Outline—data are organized into a skeletal structure that highlights key points and puts the keypoints into perspective and defines their interrelationships.
- Treatment—the outline is expanded into a narrative synopsis that gives an overview of the entire information film. Visual sequences are described—the major ones in some detail—and significant lines of dialogue or narration are written—all couched in the elements of the filmic approach.
- Storyboard—a series of drawings, sketches, or still photographs depict proposed scenes in their filmic continuity. A storyboard is not needed for every information film, although for many it is desirable. Detailed storyboards are essential for those information films in which animation is planned.
- Script—the treatment is enlarged into a detailed production plan for the information film (however tenuous) in which visuals are developed scene for scene and the complete dialogue or narration is written. Suggestions are made regarding type and location of optical effects (fades, dissolves), music, sound effects, special effects, titles, and superimposures. In practice, the final decision about these suggestions is not made until final editing in the postproduction phase. Again, I reiterate that a script is no more than a flexible guide that must be readily adaptable to changing requirements.

Not so adaptable is the structure of the script once it has been set. Structure is the frame onto which the messages hang. It is the guiding hand that leads the audience through the communication process—sorting messages into meaningful patterns that keeps the audience oriented. As mentioned in the "Research" section of this paper, structure may be spatial, chronological, operational, logical, or by critical area. Each unique communication task requires its own specially designed structure. I prefer a combination of a logical and operational structure for many of the films I produce. In essence, the generic structural outline of many of my scripts is to

- State the problem and pinpoint its significance—often set up by introducing a "grabber" to whet the audience's appetite.
- Explain how and why the problem can be solved.
- Resolve the problem to a desired conclusion.
- Wrap up "Isn't that wonderful!"

Any one of several structures or combinations may be equally valid in a given communication situation. I've often found that the particular circumstances of each information film, within the context of the filmic approach, dictate the appropriate structure.

Short Is Sweet. Many information films are too long. Loaded with too many data, especially technical data, these films are tedious, pedantic, and confusing (12). Audiences cannot perceive the essential elements of information because they are beclouded in irrelevance, nor can they understand what is expected of them. The audience, in self defense, escapes the screening environment, either mentally or physically. Communication breaks down.

Information films with a pinpoint communication thrust (stripped of nearly all the folderol and most of the technical data) are highly effective communication tools. Audiences empathize easier with information films that are clear and concise (13).

Pace. Today's audiences are accustomed to the 30-second television commercial with its rapid-fire repetitiveness that inundates them in a barrage of hard-sell messages (14)—an excellent technique if administered in small doses. If used to excess in information film, the audience will escape again. It is important to give the audience reflective time to assimilate and integrate newly presented information. Pace (fast, moderate, or slow) needs to be varied for best communication effectiveness.

Writing Style. Only a few key points are discussed here as the topic is too complex to treat in detail. To this end, the following guidelines of proven merit are offered.

- Narration and dialogue must be written in a tone appropriate to the particular audience (15). Talking up or down to audiences ensures communication breakdown.
- Gobbledegook obfuscates ratiocination.
- Passive voice dulls the audience's mind while the active voice in present tense has a stimulating, involving effect (16).
- Avoid imperatives. Telling tends to alienate many audiences.
- Tie concepts together in a memory chain linked together with smooth and relevant transitions.
- Repetition reinforces.
- Short sentences are best.
- Abstract ideas are effectively communicated through trenchant visuals and graphic words.
- Narration and dialogue are heard, not read. They must sound "good." A conversational style is appropriate for the listening audience.
- Information film is primarily a visual communication medium. Accordingly, narration and dialogue should be kept to a minimum, used only to amplify or explain what the audience cannot perceive from the visuals on the screen. Overwriting is a primary fault of many information films—too many words telling the audience too many things. The film commentary becomes the primary communication vehicle—an abuse of the medium.

Klein puts the overwriting problem in perspective when he discusses tired information films that don't communicate much "...because some idiot insists on wall-to-wall running at the mouth [narration]...they are illustrated lectures and not motion pictures at all." (17) Klein's comments are severe but cogent.

CONCLUSION

A well-scripted information film portends a successful information film. Communication goals are achieved. Resource expenditure is optimal.

Audience, client, and film designer benefit to a fare-thee-well in this scenario where the audience cares not to escape.

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FLEXIBILITY IN AUDIOVISUAL SCRIPTING

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This paper is a practical guide to avoiding the pitfalls of trying to produce an audiovisual show from a script that allows no flexibility. The paper encourages using a script as a flexible, working plan to help the producer create a successful show.

A LONG TIME AGO

As an audiovisual producer, Moses had a heck of a problem.

- The Boss was pretty important
- The topic was a bit touchy, if not downright unpopular
- The script was prewritten
- Worse yet, the script was chiseled in stone

Yet, despite all these handicaps, Moses brought the whole event off in fine form. Books about him have been written, films on his life have been made, and Moses has become almost a household word, all (but perhaps not quite all) because Moses was a master of his medium. While I don't guarantee you the same success as Moses, I think I can save you effort on your next audiovisual production.

NOT SO LONG AGO

When I was assigned to do a film, the subject made no difference. Like a good scout, I'd study the subject, talk to the experts on the subject, look at the machinery or whatever, do some audience analysis, and sit down to write the script. I'd look at my notes, look at photographs that either I'd taken or the customer had provided, and in the great by-and-by, come up with a script--a script that I thought was pretty important. Pretty important because I'd spent a lot of time working on it and because a bunch of important people had reviewed it, they had had other people review it, and they all had made suggestions and changes and additions (but rarely any deletions).

Yep, I had done a lot of work, been really busy. This script not only showed what a smart cookie I was, it also showed everybody the great amount of work I had done. But somewhere along the line, the distinction between the script and the production it was planned for became a little blurred. The script had a life and an importance of its own.

The script was now a monster out of control. It was no longer a plan for the ultimate production of a film, but a die in which the film had to be inflexibly cast. The script, not the ultimate production, had become the BIG DEAL. And nobody messes with a BIG DEAL script!

HEADED FOR DISASTER

With the BIG DEAL script in hand, I headed for a big disaster. Since so many important people had blessed the script, and since I had worked so hard to get all their changes, additions, and predilections woven into the verbal fabric, I thought the script was chiseled in stone.

But I'm not Moses, and I couldn't pull it off.

Here's what went wrong.

- The script that everybody thought so highly of did nothing visually interesting. I knew this, and kept trying to tell people so, but they wouldn't listen. They just kept adding words. Two sentences became almost a page.
- What looked great on film photographed at 4,000 fr/s was actually marginal performance. Lots of words were spent trying to explain that what looked *good* was really *marginal.*
- I got fooled into thinking that a project was hot when management only wanted to make it seem hot. Another visual disaster.

  All the additions that made up the chop chain were "woven in" on paper, but nothing matched visually. This problem wasn't apparent until I sat down and tried to edit the show. Until then, I thought I had half a chance of getting it to go together smoothly.
- The test was a dud. Nothing went well because the engineers were trying to make the system perform above its capability.
- Nobody would admit that the test was a dud.

The main problem was that *I stuck with the script.*

RESCUED FROM DISASTER

I finally realized that editing snips work equally well on the sound track and the picture track. Words *can* be cut out. Sentences *can* be cut out. Even whole paragraphs *can* be cut out. And I was generally the only one who ever knew they were missing. Of course, I didn't throw them away in case someone reviewing the film wanted them put back in. But I can honestly say that I've never had to use one of these snipped-out pieces.

By putting part of one paragraph with the trims of another, I've saved rerecording. Likewise for snipping an ugly sentence on a down inflection. Even when I had to renarrate a sequence to fit the reality of the film, the few dollars spent were peanuts compared to the overall cost of the show, and my reputation as a producer.

NOW AND THE FUTURE

Now I try not to sit in my office and take someone's word on how something works. I take a look at what it does. And I try to determine the importance of the test, equipment, data, or product. Company politics are often complex, and if I don't understand something, I ask. It's better than guessing or assuming. I also target the show to a specific audience and a specific purpose. A sales show is a lot different than a technical report.

In a film or audiovisual, the visual carries the weight. Above all else, the visuals have to make sense and tell the story. The narration provides identification and simple details. If the visuals don't work, I find some that do or drop the sequence. Impossible sequences I leave out. These are usually sequences where the words don't match the image or where both the words and image don't fit with the rest of the show. Often somebody has added a lot of words to these orphan sequences. Nobody will miss them.

I treat the script with respect, but I don't fall in love with it. If the script needs changing, I change it. I cover myself by recording alternate sentences and paragraphs to short-circuit problems. If a word, sentence, pararaph, or sequence doesn't fit where I originally planned it, I move it around to find a place where it will fit.

Scratch tracks may have their place, but I think they're a waste of time and money. I assume that my first track will be the last, even if it isn't. This saves editing time, even if I have to insert a few pick-ups.

THE WRAP-UP

This list of steps in my work is not all-inclusive, nor is it right for everyone or all projects, but it is a guide. I encourage you not to be afraid of a script and to keep it flexible. A script is only a tool, a tool that you should adapt to the realities of the production.

THE ARTIST-WRITER CONNECTION: A COMMUNICATIONS SKILLS GAME

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ABSTRACT

When an artist and writer are assigned to complete a project, its success may depend largely upon how effective the interaction is between these team members. Effective interaction helps the artist-writer team accomplish the one vital goal which they share. This goal is to create a finished project, as a team, that communicates information and ideas to a specific audience. To reach this goal, the artist and writer carry out separate roles which differ in both method and approach. The artist and writer view the presentation of information from different perspectives, which unfortunately may cause unnecessary communication barriers.

At the 29th ITCC, we presented five concepts that the artist-writer team can follow to create and foster a more positive, productive team interaction.

FIVE CONCEPTS FOR EFFECTIVE INTERACTION BETWEEN AN ARTIST AND WRITER

1) The artist and writer must desire to work together as a team.
2) Both writer and artist must understand each other's roles.
3) The artist and writer should discuss a project's priorities, establish its outline, and set appropriate deadlines as a team.
4) Responsiblities should be allocated appropriately.
5) Team members should communicate daily.

Building on these five concepts and on the experiences of other artists and writers, we have developed a communications skills game. The name of the game is The Artist-Writer Connection: A Communications Skills Game. This game clarifies our five concepts in an educational and professional manner. In addition, it helps to stimulate valuable discussions and interactions between artists and writers.

INTRODUCTION

The Artist-Writer Connection: A Communications Skills Game may be played by two to eight teams. Each team should consist of two players, preferably an artist and writer. One additional player is needed to act as the MODERATOR throughout the game.

Before the game begins, the MODERATOR determines what company the team will be working for (example, the telephone company) and what project will be completed (example, annual report).

Throughout the game, each team will answer questions and solve problems in relation to the determined company and project. A different company and project is chosen each time the game is played.

OBJECTIVES OF THE GAME

1. The team members must work together to complete a designated project through discussions and solving problems.
2. This game will stimulate valuable discussions and interactions between the team members.
3. Writers and artists can learn new problem solving techniques.
4. The writers and artists will better understand each other's roles.

CONTENTS

The game's contents consist of a game board, dice, and tokens. There are also CHANCE, REFERENCE, BUDGET, and MISSION (company and project) cards. Miscellaneous items include paper, pencils, a team award, play money, and pins.

PREPARATION

Each team travels around the board using the artist-writer token of its choice. When a team passes or lands on the BUDGET space, it automatically collects $5,000 from the MODERATOR. This is the project's budget, and it will be used to pay for all the project's expenses(example, printing costs).

MODERATOR

The MODERATOR is in charge of choosing the MISSION card. This card will determine the company the teams will be working for and the project they will complete. All teams will work for the same company and complete the same project during the course of the game. The MODERATOR is also responsible for distributing money and collecting all fines from the teams. In addition, the MODERATOR should keep track of the time and encourage or discourage further discussion when he/she sees fit.

TO PLAY

The artist-writer team who picked the Whistler-Twain token to represent it during the game will go first. This team begins the game at the corner of the board labeled START. One team member then throws the dice, moves in the direction of the arrow, and advances the number of spaces indicated on the dice. After the Whistler-Twain team has completed its turn, the play passes to the team on its left. The tokens remain on the spaces occupied and they proceed from their position on their next turn. Two or more tokens may rest on the same space at the same time without penalty. When a team lands on a CHANCE or REFERENCE space, it is obliged to draw the top card from the appropriate pack of cards.

Budget

When a token lands on or passes over the BUDGET space, the MODERATOR gives that team $5,000. This is the budget for the project.

$ Sign Spaces

As each team lands on or passes a space identified with a dollar sign ($) symbol on it, each team will either forfeit or collect money.

Chance Spaces

If a token lands on a CHANCE space, the team members must take the top card from the pack labeled CHANCE. After reading the card aloud, they must follow the instructions and return the card face down to the bottom of the pack. Other teams may agree, disagree, or add to the comments made by the team holding the CHANCE card.

Reference Spaces

On its travels around the board, a team may land on a REFERENCE space. If this happens, that team must take the top card from the pack labeled REFERENCE. A term and definition pertaining to the project's development and completion is written on each REFERENCE card. One team member should read the contents on the card aloud. After any discussion of the term, the card should be returned face down to the bottom of the appropriate pack.

Budget Cards

What happens if a team spends all of its budget and has addition expenses? If this happens, the team must ask the MODERATOR for a BUDGET card. Additional funds which may be used to pay for the overrun are written on the BUDGET cards. If the amount of money written on the card is not enough to pay for the cost overrun, the team loses a turn and requests another BUDGET card. This process continues until the expenses are paid. The team's token should remain in the same space where the cost overrun occurred until the expenses are paid for.

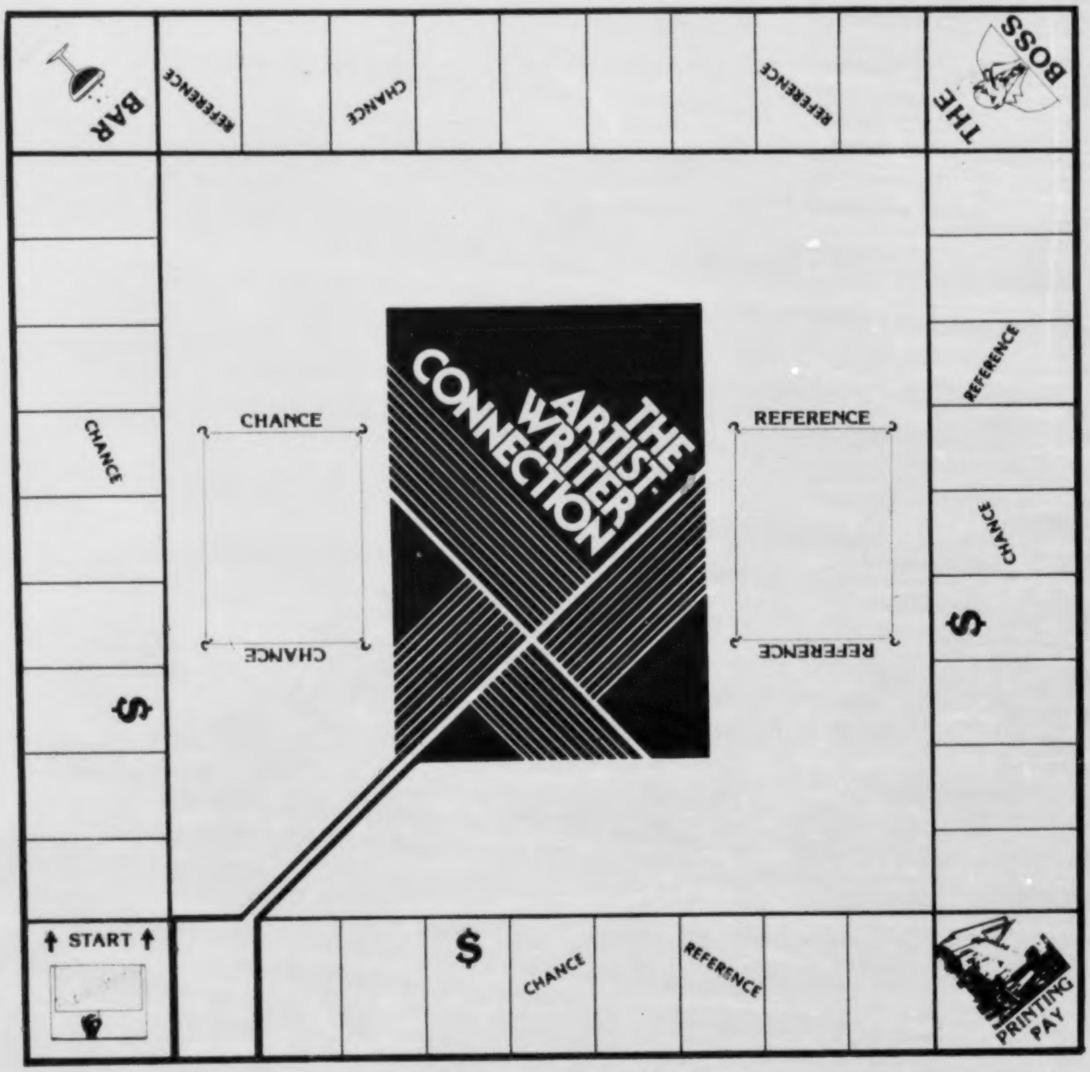
GAME COMPLETION

The project is completed when each team reaches the ARTIST-WRITER CONNECTION located in the center of the game board. The winners of this game are those players who gain new insight and understanding into a successful interaction between an artist and writer.

HOW TO OBTAIN THE GAME

If your organization would like to obtain a copy of this game, please write to Susan R. Hudak or Kathleen H. Sauer, the inventors of THE Artist-Writer Connection: A Communications Skills Game.

THE ARTIST-WRITER CONNECTION: A COMMUNICATIONS SKILLS GAME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THE ARTIST-WRITER CONNECTION

PROTOTYPE OF GAME

The Technical Writer as a Member of the Software Development Team: A Model for Contributing More Professionally

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ABSTRACT

This paper deals with one of the most common problems faced by technical communicators. The problem being addressed is the late (and sometimes less-than-adequate) documentation which can result when the technical professions, such as engineers and systems analysts, wait until a project is almost complete before addressing user documentation needs. In speaking to this issue, the paper reviews the procedures of a software development team and the technical writer. These two procedures are compared for similarities, then a proposal is made to better synchronize the two procedures.

INTRODUCTION

"To obtain better software documentation, the technical writer should be involved earlier in the development of a project."

Make this statement in a room full of systems analysts, programmers, and technical writers, and you will probably receive a near-concensus nodding of heads, both the technical and nontechnical ones alike. But try implementing such a policy and the two parties are not unlike two teenagers on their first date: they may be very enthusiastic at first, but are unsure of what to do when the time finally arrives.

While both the technical writer and the technical staff agree that the writer should be involved early, it is a difficult goal to achieve. In most cases, this dilemma is encountered because neither the writer nor the systems analyst fully understands what the other one does.

This lack of understanding is quickly dispelled upon examination of what each profession does. It is easily recognized that both a software project and documentation pass through similar phases of development. And by better synchronizing these phases, a serious proposal can be outlined in which the writer contributes to a project early in its development.

DEVELOPING SOFTWARE

The phases through which a software development project passes are strikingly similar among all organizations. While specific aspects of this procedure vary from group to group, all software development projects have the following four phases:

o Identification of the computer problem.

o Analysis of that problem.

o System design responding to that problem.

o Implementation of the solution.

The initial stage, that of identifying a computing problem (or determining that a special requirement exists) is in the form of a "request for computing capacity". This is a written one in which the computing requirements are specified in detail. Usually, the requirements state the input and output information required. They also specify any constraints imposed by the environment and the intended purpose of the computing capability.

While this request most often originates from users, this is not always the case. For example, within a time-sharing computer service, the vendor of the hardware periodically releases new versions of the operating system. When this occurs, those companies offering timesharing on that particular computer system must update their own operating system software. In such cases, the request for software capability originates with the in-house software development team itself or from management.

Once the development team receives the request, it begins the analysis phase of the project. During this phase, the team defines the computing problem in precise detail. In doing so, the analyst must clearly define the nature of the request. The purpose is to avoid misinterpretation of what is actually being requested, its use, or the scope of the project. During this process, the systems analysts must identify what the user's informational requirements are. This is evaluated in three areas: the input, the output, and the existing computing environment.

System design begins once the team has defined the computing problem, identified the information requirements, and analyzed the constraints of the existing computing environment.

Design and Implementation

The system design itself includes four major elements, which are packaged in the form of a proposal and presented to the user for approval. These four elements are:

- Purpose
- Premises and Assumptions
- Identifying Format of Input
- Specifying Design Essential Reports (output).

By stating the purpose and objectives, the design team is affirming that it has understood the computing requirements. This purpose and objectives segment of the design provides an overview of the capability being proposed. The premises and assumptions section specifies the detail uncovered during the analysis phase. In doing so, this section identifies those aspects of the current environment, such as the hardware being used or the flow of information, which have an impact on the design.

Next, the design specifies the form that incoming information will take. For example, this may entail specifying the syntax for control statements on the operating system level or the format of data within a file.

The final component of the design is to specify any output that will be generated. Output specifications will include the contents and the exact format of that output, such as the columns in which the different fields begin.

When this design is approved, the project begins the implementation phase. During this final phase the actual code is written, tested, and installed.

When all of these phases near completion, user documentation is scheduled for production and release.

WRITING USER DOCUMENTATION

Like the system analyst, the technical writer first begins a project when a request is received. Upon receiving the request the writer enters a period of orientation. This orientation is required for two reasons. First, further progress is dependent upon the writer's fitting the new information (what is known of it) into his or her existing knowledge. Only by doing this can the writer obtain additional information from the appropriate members of the technical staff.

The second reason that the orientation is required is for audience analysis. This is one of the technical writer's most important roles. It is also the most difficult, since most technical writers rarely deal directly with computer users.

During the orientation and research phases, the writer formulates technical questions. These questions range from specific technical items to assumptions about the intended audience. How these questions are answered will play an important role in the final document.

Once the research has been completed and the questions answered, the technical writer is ready to move to the next stage, which is the development of an outline. Using this outline, the writer molds the concepts and technical content into an organized form, one which both meets the requirements of the intended audience and fulfills the document's purpose. Only with a completed outline can the writer begin the actual writing process.

As writing begins, a successful document assumes an almost predefined structure. The manual begins with an introduction which tells the user the purpose and structure of the document itself. Each major section, in turn, begins by providing the user with an overview of the technical content to follow. Next, the document contains a main body where the technical content is actually contained. This same structure is repeated throughout a large manual. With each section, subsection, and individual topic, there repeatedly appears an introduction followed by a main body.

PUTTING THEM TOGETHER

Let me now propose a total procedure which combines the development phases of both the software team and the technical writer. In addition, let me propose an overview of the technical writer's responsibilities and what contributions can be made during each stage.

The technical writer's first involvement in a project begins at the same time that the development team receives the request for computing capabilities. The technical writer receives a copy of that request, which acts as the initial piece of research. This request provides a focal point for all subsequent research and provides the writer with a far better audience analysis than was previously available. Instead of an assumed reader audience, the writer has specific documentation requirements defined by an actual (though future) user. In addition, the request gives the writer a clear idea of what the computing capability will do for the user once it is implemented.

Access to the request provides the writer with answers to important questions, ones for which answers are usually difficult to find. For example: Why is the capability being requested? When a writer knows why a certain computing capability is being requested, the resulting document can better address all potential users. In addition, the audience is much better understood by the writer than under most current documentation procedures.

As the project moves into the analysis stage, the writer performs an analysis of the existing documentation. This is accompanied with indepth research. During this phase the writer determines the impact of the proposed feature on existing documentation and prepares a summary of that impact.

During this time, the technical writer should also be tracking the systems analysis. This entails attending any meetings as well as submitting the results of the documentation analysis.

An aspect that the writer should pay special attention to is the conceptual aspect of the anaylsis and how the analyst is "defining the problem". This problem definition by the analyst can be an important aspect to user documentation. It is important to remember that it is the writer's responsibility to provide the conceptual framework which allows the user to understand the technical aspects.

As the analysis progresses, the writer incorporates technical material into a growing outline and an emerging draft. Some portions of that draft should not have to be written by the writer. Specifically, the more technical content should be written by the appropriate members of the design team with the writer providing assistance and consultation.

Once the writer has developed the overview, an outline, and preliminary introduction, these components of the documentation should be distributed to all members of the design staff for their review. These should be discussed in one of the regularly-scheduled technical meetings.

This design meeting provides all the members involved with a chance to express their ideas. In addition, if the writer conducts the meeting in such a way as to stress certain highpoints, it will elicit ideas from the technical staff.

I was recently able to exercise this approach on a rather difficult project. In addition to the outline, I also included questions on issues that needed to be resolved. By presenting my ideas, I was able to get a better overview of what role the manual was going to play. In addition, I left the meeting with several specific "action items". These items needed to be resolved before I could resume, but I was able to address them before they became major obstacles to the project.

Once research is completed, and the writer has reviewed the approach, the draft begins. While writing, the writer must keep in mind the conceptual goals spelled out in the outline. During this process, the writer is providing the text documenting the different input and output reports supplied by the systems analysts.

Drafting the user documentation should correspond to the end of the analysis and the beginning stages of the design. During this time, as other members of the design team develop and subsequently state the purpose and objectives, the writer incorporates that as a part of the user documentation. The writer helps the team in working out the premises and assumption, then incorporates them into the document and reviews the manual for consistency. The remaining portions of the user documentation, that of input forms or syntax, and any output is incorporated as it is being decided upon.

As the design project draws to a close, technical details are being finalized. These last minute changes are usually technical ones and do not affect WHAT the feature going to do, they only affect HOW it is going to do it. These are such things as changes in syntax, calling sequences, or access methods. The general concepts, however, remain intact and the changes are easily handled.

The last phases of the design are hectic ones for the technical writer. Drafts must be completed and included as a part of the material that is submitted to the user community for approval. By submitting the document to the user for approval, the design team presents a clear picture of how the computing capacity will actually appear once it is completed; how it will look to the user.

During the final stage, that of implementation, the writer's responsibilities entail polishing and incubating the document. Some of the changes that may be incorporated at this stage are those suggested by the user during the approval. When these are incorporated, the writer then schedules the production and receives publication approval.

CONCLUSION

"To obtain better software documentation, the technical writer should be involved earlier in the development of a project."

Systems analysts, programmers, and technical writers all agree that early involvement contributes to better user documentation. But unless the software development staff and technical writer understand what the other one does, such a policy can be difficult to enact. A comparison of their respective functions, however, has revealed similar phases of development. And with both the writer and the analyst going through the analysis, design, and production phases together, such an objective is easily obtained.

Under such a procedure, there can be an exchange of professional expertise between the writer and other members of the software development team. The writer contributes to the systems analyst, the audience analysis, the conceptual overview, and feedback of what the results will look like to the user. The analyst contributes to the writer a technical analysis and insight into the user's computing problem.

Together, they provide an answer that is clearly stated, timely, and useful. That answer is in the form of a computing capability and supporting user documentation that is accurate and understandable, and available at time of installation.

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AUDIENCE REACTIONS TO TWO VISUAL FORMATS

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A survey involving a questionnaire filled in by 100 undergraduate students indicated that students react more favorably to a textbook with a flashier format and, simultaneously, that they regard a textbook with a more traditional format as being more scholarly.

PROBLEM

As printing techniques have become more highly developed and accessible over the past several years, university textbooks have come to use flashier formats--more color, white space, cartoons, etc. By contrast, earlier textbooks have more of the appearance of the kind of volumes which dominate the shelves in a lawyer's office--black ink on white paper, with narrow margins and few if any illustrations.

SURVEY

In February 1982 a survey was conducted using two textbooks and the data obtained from questionnaires completed by 100 students pursuing undergraduate degrees in business disciplines at Southeastern Louisiana University. The two textbooks were two of Raymond V. Lesikar's widely used textbooks of business communication: (A) Lesikar's *Business Communication: Theory and Application*, 3rd ed. (Homewood, Ill.: Richard D. Irwin, 1976) is an older textbook with a more traditional format; (B) Lesikar's *Basic Business Communication* (Homewood, Ill.: Richard D. Irwin, 1979) is a more recent textbook with a flashier format. The two books have similar content. Figures 1, 2, and 3 reveal some of the differences between the two books.

HYPOTHESES

The hypotheses which the survey sought to evaluate were as follows:

- Undergraduates view a textbook in a traditional format as being more scholarly.
- Undergraduates react more favorably to a flashier format.

METHOD

A pretest was conducted for purpose of debugging the experimental design (for details of the pretest and for further bibliographic references, see Ramsey, 1982). Then the survey proceeded as follows:

1. The students to participate in the survey were drawn from those enrolled in a keyboarding course. Students who were familiar with either of the two textbooks were eliminated from the sample.
2. Each student was given the two textbooks and asked to examine them for 2 or 3 minutes before filling in the questionnaire. No more time was allotted, because the survey sought *first* impressions--those based on appearance (graphic matters); by design, the survey sought to avoid the more studied impression which might arise from evaluation of content, readability, etc. Each book was clearly designated either A or B by means of a label attached to the book and referred to as A or B, not by title, in the questionnaire. Counterbalancing to neutralize any sequence prejudice was accomplished by transposing the labels so that what half the students saw as book A was book B to the other half, and vice versa. Also, the questionnaire nowhere made mention of format: the onus was purely on the student to react, subconsciously or otherwise, to the difference in formats between the two books.
3. One hundred fifty-five questionnaires were collected. Questionnaires were randomly discarded until the sample for analysis contained 100, with 50 female and 50 male respondents drawn equally from the counterbalanced cells.

RESULTS AND DISCUSSION

Table I tabulates the responses to the questionnaire. The polarization in these

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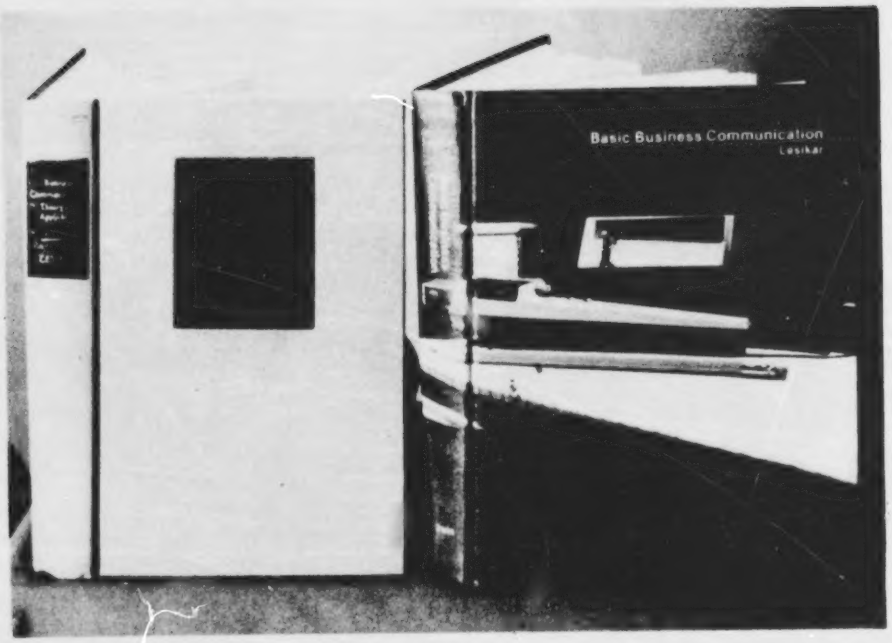

Figure 1. Exterior Formats

Lesikar's Business Communication: Theory and Application (3rd ed., 1976), shown at left, has the appearance of a law book. Shown at right is Lesikar's 1979 Basic Business Communication; the picture on the cover is in color.

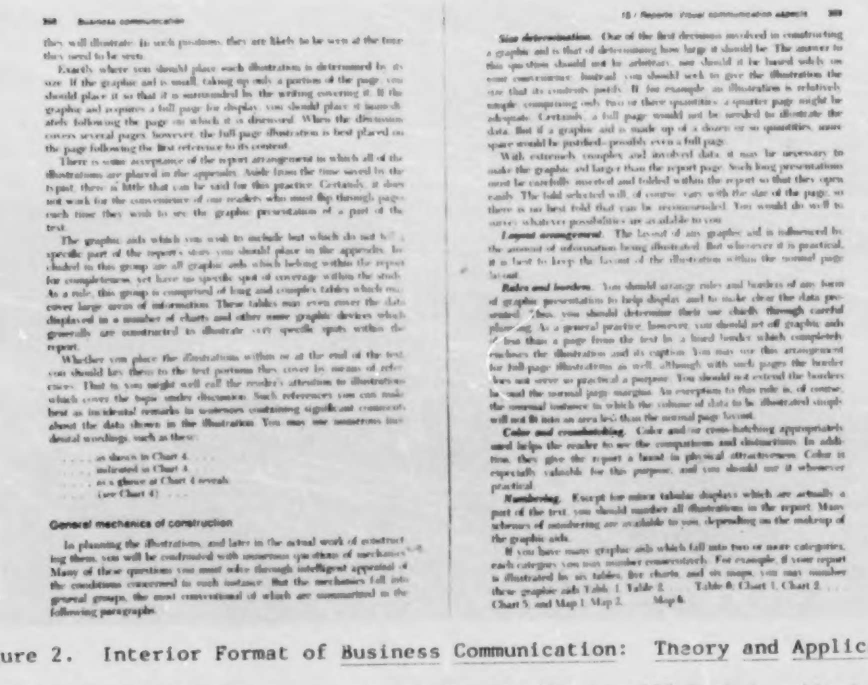

Figure 2. Interior Format of Business Communication: Theory and Application

Shown here at approximately 45 per cent of scale, Lesikar's 1976 book has black ink on white paper. The margins are narrow; illustrations are scarce. © Richard D. Irwin, Inc., 1968, 1972, and 1976 and reproduced by permission.

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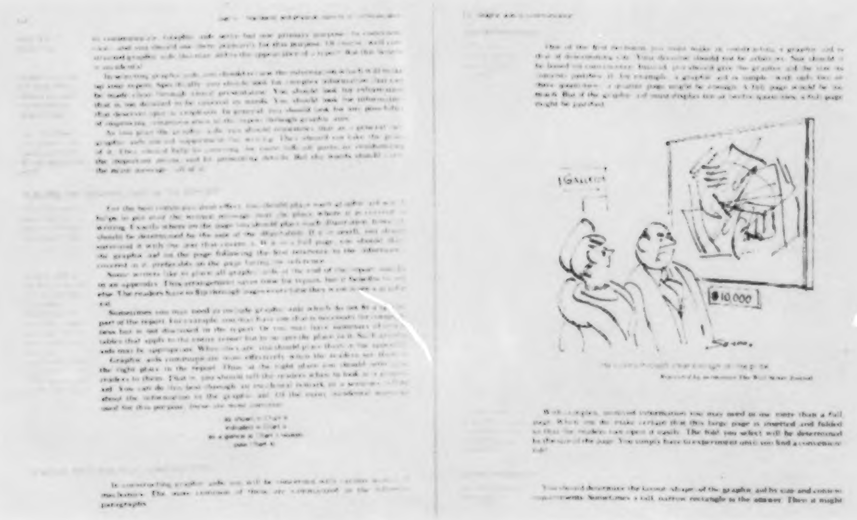

Figure 3. Interior Format of Basic Business Communication

Shown here at approximately 38 per cent of scale, Lesikar's 1979 book, Basic Business Communication, has light-red marginalia in addition to black ink on white paper. White space is abundant. Note also the cartoon. © Richard D. Irwin, Inc., 1979, and reproduced by permission. Wall Street Journal cartoon reproduced by permission of Cartoon Features Syndicate, Boston.

Table 1. Respondents' Reactions

QUESTIONS	RESPONSES Lesikar 1976 Business Communication: Theory and Application (Traditional Format)	Lesikar 1979 Basic Business Communication (Flashy Format)	No Response
1. Which textbook do you like more?	13 %	86 %	1 %
2. Which textbook will be more difficult for you?	84	16	0
3. Which textbook is more scholarly?	70	29	1
4. From which textbook would you learn more?	21	79	0
5. Which textbook is more likely to be used by a teacher over 50 years old?	72	28	0
6. Which textbook is more likely to be used by a teacher under 25?	19	81	0
7. Which textbook is more likely to be used in a graduate course?	78	22	0
8. Which textbook is more likely to be used in high school?	15	85	0
9. Which textbook will do the better job of preparing you for the final exam?	18	82	0
10. Which textbook would be of more use in an actual office?	35	65	0

Demographic information: the vast majority of the 50 female and 50 male respondents were between the ages of 18 and 21; the sample included 53 first-year students, 33 sophomores, 5 juniors, and 9 seniors, most of them being of roughly average academic caliber.

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results reveals a wide difference in the ways in which the students perceived the two books.

The following points may be derived from the results:

The students see the textbook in the traditional format as being more scholarly (Question 3) and more difficult (Question 2). The students perceive this textbook as being more likely to be used in a graduate course and as more likely to be used by an older teacher (Question 5).

The students prefer the textbook with the flashy format (Question 1). They also see it as more likely to be used by a younger teacher (Question 6). The students believe that this textbook would do a better job of preparing them for the final examination (Question 9). They think that they would learn more from this textbook (Question 4).

The textbook in the traditional format comes closest to the textbook in the flashy format on the question of which would be of more use in an actual office (Question 10). The perception is apparently that the textbook in the traditional format may look forbidding, but, like the caricature of a stern old schoolmaster, it probably knows the stuff.

CONCLUSION

Formats cause first impressions which are far reaching, much as one person's initial impression of another person filters the ensuing interpersonal relationship. The results of this survey should encourage designers, publishers, and consumers of textbooks to understand that format can, of itself, create an impression that a book is (1) scholarly or (2) likeable. These data indicate that undergraduates dissociate scholarship from likeableness. Finally, and perhaps in a lighter vein, it may be that an older teacher can enhance a desire to look younger by adopting a textbook with a flashy format (Questions 5 and 6).

REFERENCE

Ramsey, Richard David. 1982. "The Effect of Format on Students' First Impressions of Business Communication Textbooks: A Survey." Paper presented at the Southeast Regional Conference, American Business Communication Association, Atlanta, April 1-3.

VISUAL ORGANIZATION OF TEXT—BREAKING THE STRING

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Any form of discourse, including print, speech, or audiovisual work, depends on the combination of abstract and concrete, general and particular, to communicate its message. The familiar pattern of the print paragraph, where generalization in the form of a topic sentence is combined with its attendant particulars in a visually-defiend unit, is an example. Media as a whole may be arranged in a spectrum reaching from the most simple to the most complex, beginning with the linear media of speech and music, and working up through two-dimensional pictorial media to audio-visual, which compound the linear (the audio) with the two-dimensional (the video). Progress up through such a spectrum shows proportionate increase in the number and complexity of the opportunities for interplay between general and particular. Within the context of other media, print seems somewhat anomalous; having developed historically as "speech for the eyes," it is not quite speech bacuse it is inaudible, and not quite visual because it is not usually pictorial. Seeing print in the context of such a spectrum suggests that the two-dimensionality of the page could be exploited in such a way that, instead of merely presenting content in a string as if it were transcribed speech, the structure of the interplay between general and particular could be visually displayed. The traditional paragraph structure goes only a little way towards making structure visible. Technical and organizational writing, on the other hand, have gone much further, finding a large variety of devices to exploit the two-dimensionality of the page. What is more, with the near-universality of word-processors and the growth of computer graphics, there seems to be no reason why printed texts should not express relationships among concepts by "Visual Organization of Text," even perhaps in non-rectilinear ways.

Humans, like other creatures, constantly receive, process, and act on a flow of information to fit themselves to their environment or their environment to themselves. In our species, as befits our need to deal with absent or abstract phenomena, smell, taste, and sensation have all but atrophied in the workplace (remaining lively, however, in the bedroom and kitchen). To all intents and purposes, we members of the information society interact with our cultural, economic and technological environment in response to information from our eyes and ears.

Auditory and visual information form a spectrum, or rather a complex, much more elaborate than is immediately suggested by the terms "audio" and "video". For example, if we associate "video" with pictorial events and "audio" with dialogue or commentary, how do we account for the explanatory text scrolling up the screen at the beginning of an old Western movie? Or consider a piece of multimedia overkill such as this: the word TENSION in jagged zebra-stripe lettering superimposed on a slide of a face with teeth clenched, while the audio track discusses tension headaches over discordant music. Such examples make it apparent that linear (word strings) and two-dimensional (pictorial) media can be combined to share the task of communication or occasionally (as in the repetition of "tension") double it.

Speech is a linear medium, in that one moment cannot be compared to another except by memory. Print is in many ways a mere transcription of speech; relationships among concepts are indicated by function-words and markers like "firstly" and "secondly". Even a still picture, on the other hand, is a much richer communication device; more relationships can be conveyed in a small compass by a mechanical drawing (or an allegorical painting) than by prose.

Pictures, of course, do not always stand alone. Print may appear alongside or within them. It may become part of the design or even the design itself, as in business graphics or in "concrete poetry".

Thus, even without considering moving pictures or adding sound, we have several very diverse formats to consider. With audio-visual media (slide-tape, filmstrip, motion picture, or video), we reach great richness of expression. The audio channel can carry music as well as narration; the video can carry not only representational pictures, but also superimposed print or animation; either of these can illustrate the other.

Most authorities recognize that the core of communication, in print at any rate, is the combination of abstract with concrete, general with particular. Communication in any medium is a matter of combining two elements, each insufficient by itself, into a synergistic whole greater than the sum of its parts. Discourse will be ineffectual if it provides, on the other hand, only a set of unrelated particulars rattling around like a shoebox full of small parts, or on the other hand a sequence of generalizations with no details to make them present in the reader's mind. Effective discourse must "walk on two legs"--the generalizations are there to provide cues for making sense of the particulars, and the particulars to present specific examples of the reader's inner eye, ear, or (perhaps) an unnamed sixth sense which apprehends concepts nonverbally.

This familiar topic-sentence-supporting-detail paragraph, where the topic sentence provides conceptual or local context for illustrative detail or amplification, is a useful tool for learning because no matter how hackneyed or obvious it may be it seems to mirror the way the mind works, from the known to the unknown, the "given" to the "new". Most commonly, though not always, the generalizing information is the known, and the support material the unknown.

All this is pretty familiar to anyone involved with writing, whether as writer, reader, or teacher. Consciously or otherwise, most people write by stating their topic and expanding on it in a paragraph. Readers are accustomed, consciously or otherwise, to search for a stated or implied "topic" sentence to give direction (or "slant") to the illustrative details. And teachers present these principles in necessarily oversimplified form in various classroom routines on "topic sentence", quests for the "main idea", and exercises to elicit a concrete immediacy in writing.

Although in both cases the discourse remains based on the interplay of abstract and concrete, general and particular, audiovisual discourse is much more complex than expository prose. Not only are there two "channels" instead of one, but the visual portion is exceedingly rich in possibilities for displaying the hierarchies of general and particular, given and new. As well as organized "sequences" of longshots and closeups the visual channel may carry explicit verbal cues in print form, which may themselves be spatially arranged to show conceptual relationships. Since the disposition of a new concept in the mind entails revisualizing other related concepts, the structure of any discourse is better grasped if its elements can be "seen" dimensionally in the mind, and hence any two-dimensional medium, print or pictorial, offers more opportunities for exhibiting structure than a linear one. It is significant that modern instructions for oral presentations insist on the importance of prominent visual display of the structural points.

The complex audio-visual end of the spectrum of communication by eye and ear, then, has much to teach writers of expository and technical prose. In the first place, just thinking about the writing of prose in such a context will suggest that the act of appearing on paper, as if on a screen, liberates a text from the need to appear only in a string. Secondly, the revisualizing of an idea in context is clearly made easier by appropriate spatial relationships on the page. In fact, analogy with audio-visual media suggests that just as an audio narration and pictures support one another, prose could be two-dimensional in a similar way, with the string of information as the "audio" and the visible organization as the "video".

Historically, print seems to have developed as a transcript of oral discourse, as "speech for the eyes." Up to now print has been rather slow to take possession of its two-dimensional domain: the manuscripts of the ancient and medieval worlds did not even separate words for readers; the many headings in medieval manuscripts of Aquinas' Summa Theologica were not indented; and paragraph-indentation did not become common before the Renaissance. In our time, academic writing has arrived at a standard way of displaying the hierarchy of general and particular, topic and comment: the topic of the paragraph is stated in the opening (or sometimes closing) sentence, and subordinate or illustrative detail is associated to it by means of various anaphoric cohesive devices, such as pronouns (personal or demonstrative), the definite article, or the repetition of words. Further research suggests that ideal prose discourse obeys the principle that comprehension of a sentence is aided by ensuring that the generalization precedes the particular.

Thus, expository prose has shown gradually increasing exploitation of its structuring opportunities, from "speech for the eyes" to the indented topic-comment paragraph structure, with a prominently leading topic, accepted in academic discourse today.

Non-academic discourse, notably the organizational writing of government, business, engineering, the military, and other fields where complicated administrative or technical information has to be conveyed clearly to several kinds of readers at once, provides evidence of the further extension of expository prose into its two-dimensional domain. For such purposes, highly structured prose, numbered topics, underlinings, heavy type, bullets, white space, and a whole host of typographical devices for displaying the cognitive structure of a document to the reader have become common. Such devices have been considered unacceptable for professional publication by some writers, either because the writers feel their style is coherent enough not to need them, or (alas) because it is not coherent enough for the structure to be clearly identified. The development of "Visual Organization of Text" (VOT) in technical and business writing might better be regarded as a movement towards clearer communication which expresses, rather than replaces, effective writing.

With rapid manipulation of verbal display on Video Display Terminals, it may soon be possible to go another step and arrange concepts spatially in non-rectilinear ways to denote a wide variety of relationships, with printers capable of printing verbal information shaped the way the writer intended it to be in the reader's mind.

"SUCCESSFUL PRESENTATIONS BEGIN WITH THE PRESENTOR"

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ABSTRACT:

Communicating effectively is a difficult challenge, but visual tools and techniques can help. Visual elements, incorporated with the dialogue, will help the audience perceive and retain the message. Visuals, the sequence in which they are shown, and how they are viewed can greatly affect an audience's understanding and retention.

The presentor's role is extremely important in an effective presentation. Defining the message and then presenting it briefly, concisely and clearly is critical.

Effective visual presentations also require careful planning and execution. To begin the process a working knowledge of the various presentation media is essential. The presentor must be familiar with the eight primary presentation modes:

- Overheads (vu-graphs)
- Flipchart
- Chalkboard
- Videotape
- Film
- Slide projector/screen
- Slide projector/audioviewer
- Hand-outs
- Information cards/panels

Other considerations are: how to use the above methods; how to successfully combine different methods; what method to use in relation to audience size and type; which method to use in rooms of different size and configuration; how long should the presentation be; what is the cost and method of producing the visuals; is an important consideration and what graphic help from outside vendors and others will be required.

An effective visual presentation is the combination of many physical and psychological factors. The presentor's ability to understand and evaluate these factors in a timely manner will determine the program's success.

Communicators of all types will be confronted with the task of delivering a presentation sometime. The frequency of presenting, the size of the audience, and type of presentation will vary with each individual. Regardless of these variables, there is one common goal—making an effective presentation.

The presentor:

The presentation's effectiveness is determined in several ways. Perhaps one of the most overlooked factors is the presentor. Remember that the audience is watching both the presentation and, more directly, the presentor. The presentor should ask him or herself the following questions as the first step in giving an effective visual presentation.

1. Are you thoroughly familiar with the topic?

Your knowledge of the subject matter is critical if the presentation is to flow smoothly. An audience will quickly determine you know the material by your mannerisms and whether you use visuals as a crutch rather than an aid. A lack of knowledge is obvious when the presentor talks to the visuals by turning from the audience repeatedly to view the graphics and by making short, incongruous statements.

2. Can you isolate what needs to be said?

You must convey to the audience only the information pertinent to the topic and eliminate what is extraneous and superfluous. Be clear and concise.

3. Do you know what information the audience is looking for?

By defining the audience, you can then define the message. The audience is gathered for a specific reason, so you must determine what information is appropriate and to what detail it is given.

4. Are you confident and at ease in front of people?

Knowledge of the topic, preparation, rehearsal, experience and the presentation medium used all affect a presentor's attitude. Each person feels differently about giving a presentation, and those emotions will change with each audience and topic being presented.

5. Are you prepared for questions, sidetracks, and diversions?

As a presentor, you must anticipate these factors and be prepared to act/react accordingly. Interruptions can disorient the speaker and the audience resulting in a loss of continuity. Diversions can also be detrimental if the presentation is to be given in a predetermined amount of time. If you feel your topic will generate questions or if you plan to ask questions, give yourself enough time. For unplanned interruptions, it is imperative to get back to the topic as quickly as possible. You may find index cards or an outline script helpful.

6. How much time is available?

If you know how much time is allotted, stick to it. If you don't, establish one. Very often the success and effectiveness of presentation is determined by this criteria.

7. Have you created a checklist?

Such details as equipment needs, accessories, materials, amount of time/directions needed to reach the audience, and the size and configuration of the room are critical. A checklist should be prepared early in the presentation process, adding any other details during the preparation stages.

This first section has dealt primarily with the presentor and his/her effort in giving a presentation. Part II of this paper will now deal with the effective organization and message definition of a presentation.

Organization

In organizing a presentation, a key area to evaluate and determine is sequencing. A common organizational approach is preparing an outline. By organizing the presentation content in this manner, you can easily identify the information, determine the relationship of its various parts, and then put those parts together sequentially. This "thought-flow" process is critical in developing an effective verbal/visual concept. An outline will greatly aid in determining which information is:

- superfluous, extraneous
- redundant
- missing
- incongruous.

The outline will also help you organize and develop a visuals concept, so that it will be reflect the presentation's objectives.

The second key area in organizing the presentation is to determine which approach best conveys the message.

1. Telling a story
2. Giving facts & figures
3. Asking questions and giving and/or soliciting answers
4. A combination of the above.

The third part in developing effective visual presentations deals with the visual element. Audience's attention span is limited and a true cross section of retention levels doesn't exist. It is important, therefore, to incorporate the following areas into the presentation.

1. Use lay terms whenever possible. Use of jargon should be at a minimum because it can confuse the audience and quickly alienate them. You will always have to decide not only what information to present, but how to verbally and visually present it so that the audience understands and retains what is said.
2. Show key words or short phrases. An audience will grasp them faster and easier than written or verbal dialogue.
3. Graphics should be large and clear. They should be drawn to show only pertinent information.
4. With time to consider, show several visuals quickly to illustrate a point, putting too much information on a single visual can be potentially confusing and unreadable.

These characteristics usually determine what type of presentation to develop.

1. Type of audience—informal, formal, client, inhouse
2. Size of audience
3. Size and configuration of the presentation environment
4. The length of time available
5. Type of information being presented
6. Budget
7. Availability of graphics services
8. Preparation time including concept, review, preparation and production.

As mentioned earlier, in preparing the presentation outline, you may wish to prepare a storyboard. A storyboard shows how the visual and verbal elements can be combined. By "visualizing" the presentation in this manner any additions, changes, or reorganization of the concept can be made before the more costly production process.

Producing your program, with cost and time to consider, is discussed in Part V. Presentations that incorporate flipcharts, blackboards and handouts may be organized and produced totally by the presentor. However, when using slides, overhead view graphs, films or videotapes, an outside service or the graphics department is needed. In either case, you will want to give the service an outline or script of your presentation so that visuals can be discussed and costs can be determined. It is critical that any outside service be brought into the planning process as soon as possible so that all elements of the planning can be done in an organized and cost-effective manner. Different presentation mediums have different production costs and specific time considerations.

If you wish to do any or all of the visuals yourself, materials and books containing preparation guidelines are available. These guidelines are also beneficial if used as a reference source defining the processes of the various presentation media. Available books are:

"Multiply your Images: How-and why-to get started in Multi-Image"
"Slides with a Purpose for Business and Education"
"Professional Presentation, Minimum Cost!"
"Effective Lecture Slides"
"Materials for Visual Presentations: Planning & Preparation"

The above periodicals are available through:

Eastman Kodak Company
Motion Picture & Audio Visual Markets Div.
Rochester, NY 14650

"A Guide to Overhead Projection and Transparency Making"

Available through:

Scott Graphics Inc.
Holyoke, MA 01040

WHAT PRICE MARKETING MAGIC?
THE VIEW FROM "NO-MAN'S LAND"

Mitchell Winn — David E. Cook

The direction of Corporate communications projects imposes extraordinary demands on those who seek to breathe life into inherently lifeless information.

Technical communications needn't be dull nor must they be comprehensible only by jargonists. Making them come alive is both a creative and administrative challenge as the visions of artists bump up against the realities of hard-pressed keepers of the purse strings.

Shielding the creative people from the Corporate Monolith puts communications direction in a "No-Mans Land" between two vastly different value systems. But the effort can pay off. And sometimes, there's even a little glory to go with it.

Here are two perspectives on a project that addressed this problem—with winning results!

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WORKING WHERE THE BOMBS FALL: THE ANATOMY OF A PRIZE-WINNING AUDIOVISUAL

In the beginning . . . there was the "Good News": The Company was about to introduce a new product for which a slide/tape program was to be the promotional centerpiece.

Then came the "Bad News": (1) There was almost no data on the new product; (2) The new product's performance profile was inferior to another, almost identical product the Company had introduced about three years earlier, (3) The "new product" was very similar to, and not really better than, competitive products that had been on market more than five years; and, finally, (4) the slide/tape program was wanted in less than 100 days.

In this age of sophisticated, fast-*moving* visual imagery, A/V marketing employing the slide-tape format is inherently problematic, especially the single-projector type of program. In the rapidly-changing world of medicine—the world for which the "new product" A/V was required—the format is particularly challenging. After all, Magic Lantern techniques were developed decades before anti-biotics.

In defense of the Corporate decision on this new product introduction, it should be noted that the A/V was intended for an international marketing effort that included, apart from the more advanced countries, such places at Bangladesh, Sri Lanka, etc. - places where current communications technology is scarce. Still, more than 90% of pharmaceutical sales are to places were electronic technology is either equivalent or superior to our own.

The point is made not to carp with Corporate wisdom concerning the *need* for their new entry—after all, professional communicators, like soldiers, adhere to the credo, "Not for us to reason why, just for us to do or die"—no, rather the point is made because it helps set the stage for the most critical consideration bearing on the problem: How to effectively script and produce such a program.

Adding to the complexity of this challenge was the fact that the selling of medicines is directed to a traditionally conservative audience—physicians—who rather fancy that they, unlike the rest of us, are above commercial blandishments. Accordingly, under the best of circumstances—when there is a genuinely new *advance* in chemotheraphy—the message is still presented low-key.

So that pretty well sets the stage: We had to write and produce an A/V marketing tool on a ho-hum subject for which there was little information to impart to a jaded audience.

Sleepy Subject

The product in question was a sedative-hypnotic—in non-medical parlance, a sleeping pill. The strategy developed to script the program was to review different types of sleep disorders; review the 20th-Century history of sleep medicines; create a hypothetical profile for the *ideal* sedative-hypnotic; then show how the Company's new entry fell within the parameters of that ideal.

The silver lining to our black cloud was that the script fairly flew through the usually grim manuscript review process: when one reviewer complained about the dearth of hard data in the script, he was referred to the findings and the story of the Emperor's New Clothes. His approval was immediately obtained.

Now the most absorbing part of the project began in earnest: finding a way to make this thin story come to life in the visualization.

A frequent and serious difficulty in the production of A/Vs is that too often, the visualization is left entirely to those ultimately charged with its creation - with the predictable result that client keeps rejecting elements, and the producers finally opt for the obvious and the dull such as word-slides. Ideally, the writer should be able to think visually as he or she writes because the visual concept is as critical to the workability of the script as is the text. This is not to say that those who will produce the visuals should be locked into the writer's visual concept. What is important is that there be a visual frame of reference from which refinements or superior alternatives can spring.

Know the Good Guys

Knowing who the good producers are is a prime concern of a professional Communications Director. For this project, it was clear that extraordinary design execution would be needed. Moreover, it was evident that unusual bid procedures would be necessary to find a production house capable of doing much with little.

As originally written, the show was to be about 12 minutes in length, require about 65 visuals and a mixed sound-track. Of the five production houses approached, four answered the bid request whose unusual feature was a requirement to submit black & white rough pencil sketches of four pages of the approved script—about 12 visuals in all.

It's interesting to note at this point, that although it was not required, all four houses submitted better-than-rough visuals and presented them in color. Additionally, three suggested some live photography as well as flat art.

One submission was of particular interest, but since it was not the low-bid, some "creative engineering" was called for to get past a group review of submissions in which bottom-line thinking often predominates. Accordingly, the four submissions were mounted in a conference room, and each member of the group was asked to vote, by secret ballot, for the presentation they thought best. Subsequently, the Communications Director was pleased to announce that the submission selected was the one he, too, preferred.

Good communications management requires a very special blending of the creative energies of many people. If those who will be charged with the making of the elements feel that they have input and can truly effect the quality of the end product, the final results can only be better for it. But this can also create some consternation on the part of the non-creative people on client side who must review the kind of adjustments that inevitably occur as the project moves forward. Some words will be changed, and it's not unusual if the sequence of ideas is altered to improve visual flow. Accordingly, the Communications Director's first priority, as production commences, is to invest sufficient time with this creative team to talk through ideas, test them with rough sketches, and generate visual treatments that rise above the mundane no matter how expedient the obvious might be.

It's not easy. A lot of ego is on the line, both on the part of the creative team members and also on the part of the Corporate reviewers who are discomfitted by surprises or something different than what they expect or are accustomed to.

No-Man's Land

Inevitably, the Communications Director finds himself in a lonely No-Man's Land between his creative people and his Corporate colleagues. And that's where the bombs are falling. In this project, a decision to do some very elaborate large-format live photography with professional models strained budget, so another decision was made to eliminate some flat art to compensate for this; later, an additional piece of information required by Product Management interrupted the carefully devised *flow* of information, thereby requiring additional, unforseen changes. Then there was the rebellion by the keeper of the purse strings when presented with the additional costs the added information engendered. And this was followed by a stop-work posture by the production house until this matter could be resolved. Inevitably, all of this delayed the project's completion and brought up the issue of late delivery penalties which simply could not, in all fairness, be invoked. But oh! how the fan did turn!

What should be self-evident in the creation of compelling A/V materials is that good work never comes cheap. The problem is that "bottom-liners" rarely have a reasonable handle on what constitutes good work—particularly in that most difficult of formats, the single-projector slide/tape program. How many people will know, for example, that the creation of a chart which is photographed by the underlit, hold-back process to create extraordinary richness of color may require as many as 24 separate, pin-registered exposures to make one slide? Could it be done in an easier way? Sure, complete flat art in a vacuum frame will show the same information—but it will look pretty much like any other slide we've all seen thousands of times.

Could we portray the insomniac in live photography with a single exposure in 35mm? Yes, it would do. But by shooting multiple exposures of the same figure using a large-format camera we convey his tossing and turning in a more effective way which, when reduced to 35mm, will have a sharpness and clarity impossible by usual methods.

And how about using a puzzle with a series of missing pieces and a collection of capsules and pills to illustrate the problems of diagnosis? Would a drawing do the job? Yes, but having a model of the puzzle and models of capsules and pills about 50-times life-size, then shooting it large-format for later reduction, produced a richness that a drawing, shot in 35mm, never can.

Doing the Unusual

Clearly, you can't do the unusual without real creative talent at every level—as I had on this project, and as you will appreciate when Mr. David Cook tells you, from a technical design perspective, what made this undertaking different than many others.

But talent alone can't guarantee good results even if the script is strong and visually well conceptualized. The Communications Director must also see to the creation of a working atmosphere in which the major concern of the creative team can be *quality in execution.* Because they were insulated from the vagaries of the Corporate decision process, our production team was able to concentrate on what its individual members do best: muster the creative artistry that makes the ordinary extraordinary.

It's a lonely place, but sometimes there are extra rewards. Sometimes your peers—who understand a little more than other folks about all this—say, "Well done."

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CREATIVITY VERSUS THE CORPORATE MONOLITH

Although this is the story of a prize-winning slide show, it could well be titled "Creativity Versus the Corporate Monolith." But a show like this just doesn't happen. It requires the combined creative talents of a lot of people — creative talents that are, very often, painfully strained when confronted by the Corporate Monolith. The Monolith in this case was a major international pharmaceutical corporation.

It is also a story of people and the decisions they made in order to maintain creative excellence while engaged in that confrontation. The *challenge* was there from the beginning. This was never intended to be a show like all others.

The Corporation's Communications Director was required to produce a slide show which would stimulate physician interest in a new product that was inherently uninteresting. He knew this would require an uncommon effort and set out to acquire a creative team equal to the task. After surveying a number of production houses, he selected four in whom he felt confident, and put them to the test. He sent each, a copy of the script (words only; no scene descriptions) and a draft of the product monograph for background information. He then requested that each submit not only a cost and time estimate, but also storyboards for twelve designated slides. This would enable him to evaluate creative concepts and compare them to the costs submitted, as well as justify cost differences to the Corporation.

A Unique Challenge

I thought that this was a wonderfully unique challenge. One that I can not remember facing since I left art school — a number of artists submitting designs for the same assignment. But there was a subtle difference. Instead of *everyone* getting a grade, the *winner* got paid. I had been asked to work on this project by a local producer I knew to be extraordinarily creative. I should mention that this producer specialized in 16 and 35mm motion picture production and had never before worked on this type of slide show. But what's another challenge among friends?

Several lengthy discussions ensued as our production group formulated our design concept — one that would require the use of highly graphic, underlit artwork for all slides. We chose this approach for the clean, highly saturated colors it provided and not for any cost considerations. Some of the slides that we ultimately produced were to require as many as 24 exposures on a single frame.

But before we produced any slides, we still had to submit storyboards depicting our concept. Although color boards were not required, we felt that they were necessary. Since we were storyboarding only 12 visuals, I decided to show a variety of ways that our concept could be applied; a decision that almost lost us the job. Some on the selection committee failed to see versatility in our submission, perceiving, instead, a lack of continuity. However, the Communications Director was delighted and we ultimately won the contract. But as we were soon to learn, our real challenge was just beginning.

The Corporate Vision

At the first creative session, the Communications Director presented us with a previously prepared visualized concept of the script - the client's ideas of every slide, none of which even remotely resembled the storyboards which had won us the contract. And that raised a creative issue: Should we merely give birth to the Corporate vision after laboring so hard to prove our creative versatility? No, we had more than that to offer. Ours was to be the road less traveled. We would fight, if necessary, to breathe life into our best ideas.

We were fortunate that the Communications Director was willing to work with us toward the attainment of this goal. But it was to be his burden to carry these emerging concepts back to the Monolith and do battle within. Through three sets of pencil storyboards and an equal number of layout revisions the battle was waged. Many were the times that we vented our frustrations at each other and struggled to convince ourselves to persevere. There was always the temptation to just give up and say, "Here's your job back. We don't want to have anything further to do with it!". But, through adversity, there developed a strong sense of will. We were able to make a pact among ourselves to "produce the very best show that we were capable of — one that we could be proud of when it was finally done."

Battle of the Budget

Perhaps the biggest stumbling block to the successful completion of this show was placed in our path at that first meeting of the Communications Director. The client was determined to use studio and location photography with no less than 3 live models to portray a series of slides about insomniacs. This proved to be a major expense which we had not included in our quotation. As we were determined not to cut corners and do a sloppy job, but achieve maximum quality by shooting on 2¼ or 4x5 prior to duping onto 35mm, the cost of the live photography increased the budget required by at least 50%. You can well imagine what an effect that had on the Monolith, not to mention the Communications Director who found himself caught in the middle, with a desire to produce the best show possible for the corporation within the parameters of justifiable cost.

Unfortunately, within every corporate structure there seems to lurk that one individual, usually in a position of authority, who remembers another show that "didn't cost anywhere near as much." But this individual often forgets that it was produced at least 10-15 years ago. The Communications Director—now turned negotiator—took verbal volleys from both sides as he worked out compromises with the producer and attempted to fill in any chinks that had appeared in the Monolith. Reason prevailed and production began in earnest.

The Tools for the Job

A camera stand was constructed from standard building materials, with a light box built in for underlighting all of the artwork. Acme registration pins were used to guarantee alignment of the many overlays and masks that would be necessary. A specially built mount to hold a Nikon F2 camera had a built-in cable release which connected to the clutch release button on the bottom of the camera. Since all the slides required more than 1 exposure, this clutch release button had to be depressed whenever the shutter was recocked for a multiple-exposure.

All photography was accomplished using a 55mm Micro-Nikkor lens with a specially constructed filter box. This box allowed the placement of varying combinations of colored gels, neutral density and diffusion filters in front of the lens. We made test exposures using a wide range of these gels and neutral density filters. The processed but unmounted film, when spread out on a lightbox, provided a unique color pallette from which each color could be visually selected and reproduced with accuracy.

Studio photography moved forward as carefully as did the stand photography. One multiple-exposure picture of a man in restless sleep triggered seemingly endless discussions as each person attempted to explain to the others how he/she envisioned the final image. It was later discovered that each of us had shared the same vision, but had attempted to describe it with vastly differing words. Considerable time was also required to make a series of experimental Polaroid exposures of the effect prior to executing the final shots on 4x5 film.

A six-slide puzzle sequence necessitated the construction of a 40x60 inch puzzle with removable pieces. This scaled-up size was employed in order to cover any imperfections that might show up around the cut edges when photographed. We were also faced with the challenge of creating 6-inch long model capsules and a model tablet which would match the scale of the puzzle.

In Pursuit of Perfection

The graphic art slides required a great deal of attention to detail. Each exposure was meticulously noted. Four to twenty-four individual exposures were required for each slide, and some of the slides were rephotographed many times before we achieved the final image we sought.

Perfection is a lifelong pursuit. There is always something that you would do differently the next time, for there is always more than one solution to a given problem. The challenge is in finding the most appropriate solution. We may not choose the same solution the next time we face a similar problem, but we should always be prepared to challenge the Corporate Monolith in the quest for excellence.

Photography and The Publication Process
A Technical and Mechanical Primer

Dan Morse
Los Alamos National Laboratory

Dan Morse
Los Alamos National Laboratory
Supervisor Black and White
Photo Services MS P350
Los Alamos, New Mexico 87532

1981, 1982 PPA
Industrial Photographic
Department of the Year
Technical Award

Technical publications in all forms often are compromised as a final product by a lack of knowledge and understanding of photography and graphic arts production. My workshop will provide the participants with an in-depth look into the mechanical and technical aspects of photographic and photo-offset reproduction.

Capturing a moment.

THE IMAGE

We will begin by examining how the photographic image is produced. What physical and chemical changes take place to create an image? What's a negative and why do I need one? We will examine the characteristics of specific films and processes and see why they are used. This examination includes exposure and contrast responses, color sensitivity, and how these qualities are exploited. An understanding of the nature of the photographic image will lay the foundation for the workshop as a whole.

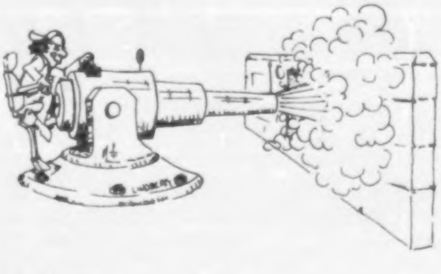
THE PHOTOGRAPHER

We will expand on the role of the photographer as it is commonly defined. We'll disucss how photography supports the publication process and, particularly, how great that role can be. We'll discuss why and how my own section expanded and redefined its services to assist in my company's publishing effort. And we'll identify where photography fits in, when to use it, and when its not necessary.

Blowing up an illustration.

THE PRINTING PROCESS

A comprehensive examination of the equipment, processes, and mechanics of photo-offset printing will be presented. We will discuss the individual steps necessary to get a "camera-ready" publication to the press and why these steps are required. We will discuss how an offset press prints and the necessity for techniques such as halftones.



Shooting a halftone.

CONCLUSION

The final segment of the workshop will be devoted to examples of what went wrong and how to prevent the problems. By using the information presented in this workshop, we'll discover how to avoid problems in the final product that not only could have been prevented but that might even have been created by the editor or writer. Persons desiring to attend are encouraged to bring their own bad examples.

MANAGEMENT AND PROFESSIONAL DEVELOPMENT

Helen A. Lindberg
Los Alamos National Laboratory

Helen A. Lindberg
Los Alamos National Laboratory
Assistant Division Leader
Isotope and Nuclear Chemistry Division
MS J515
Los Alamos, NM 87545
(505) 667-3689

Outstanding Speaker Award
26th ITCC

Practical solutions to managerial problems for prospective, new, and experienced managers—this is the emphasis of the Management and Professional Development Stem in 1983.

For new managers, we will start right at the beginning with a workshop that teaches interactively the skills for recruiting, interviewing, and hiring personnel. But once you have hired your employees, how do you make them an integral part of your organization, then keep them happy and productive—particularly those strange creative types?

Or maybe you can manage people, but it is "things" that give you trouble. How can you control budgets? publication quality? endless meetings? daily and unexpected softward changes?

You have none of these problems? Then your operation should be running smoothly and you should be producing very effective publications. . .but are you really? Do your publications deliver the intended message and meet audience need? If you brought one of your publications with you, you may participate in a workshop where you can have your publication evaluated by your peers. And your proposals—are they bringing in the funding, or are you just "shoveling snow with a pitchfork"?

Maybe you are an experienced manager and you are looking for some revitalization. We have some suggestions for changing your management strategy, or getting a new degree, or applying your experience in new roles.

If we have reached this point and not helped you at all, don't give up! Maybe you need help with basic problem-solving techniques, and if that doesn't do it. . .perhaps stress management?

We have planned a Management and Professional Development Stem that will help you toward solutions for all these issues. Even if you are not giving a formal presentation, you have something to share. Bring your questions, your answers, and your experiences, and be prepared to participate in a program that will invite you to do more than just sit and listen. You can be an active part of this stem as you share your ideas in discussion groups and tutorials, or participate in interactive workshops. This year you will go home with a briefcase full of ideas for improving your communications management.

FIRST IMPRESSIONS ARE LASTING:
TEACHING THE ROPES WITH NEW-HIRE ORIENTATION

Rosemary Pugliese
International Business Machines Corporation

Rosemary Pugliese
International Business Machines
Corporation
Senior Associate Information Developer
Kingston, New York 12401

- Taught writing courses
- Coordinated new-hire orientation

Like many corporations, IBM has established formal training sessions for its new-hires. These sessions are usually held on a site-wide basis and are meant to orient new-hires to company policy and procedures.

While these sessions meet their goals, new-hires need another level of training. Not only must they be oriented to the company at large, but they must also be shown how business is conducted in their own departments.

To this end, Publications in IBM Kingston has developed a training program to suit its new-hire technical writers. At management's request, nonmanagement writers have developed a series of seminars. These seminars introduce new-hires to how Publications does business on a daily basis. This paper covers what topics are discussed, how the topics have changed, and feedback from new-hires who have attended the seminars.

HOW SEMINARS ARE SET UP

A nonmanagement-level writer organizes the seminars. This writer examines topics covered in past sessions. Feedback information from past attendees is available. One important criterion in choosing topics is that they must be suitable for *all* publications departments. They cannot fit just one area's needs.

After choosing topics for the series, the seminar leader gets volunteers to cover the topics. Volunteer speakers include management and nonmanagement writers. Each volunteer prepares a presentation one-half to one hour long.

Graphics are an important part of the seminars. The quality of the artwork varies, as Figure 1 shows. But good intentions and not necessarily a steady hand are the usual.

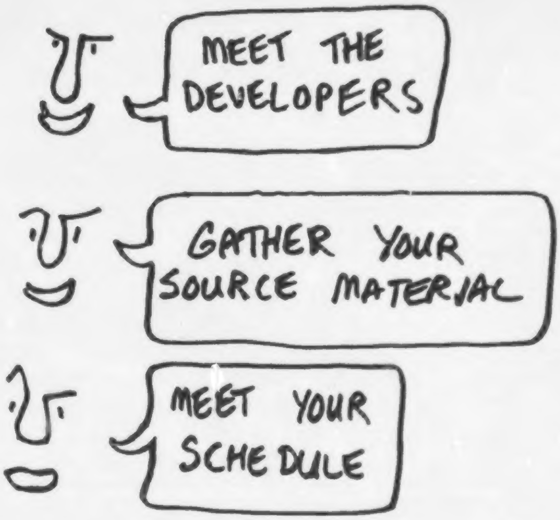


Figure 1. Artwork Sample

Seminars are usually given biweekly, for 6 to 8 weeks. They are done on an intense schedule so new-hires can get information quickly on how to go about their jobs. While some new-hires attending may have been working for a few months, the seminars are held as closely as possible to when new-hires first start work.

Seminars are informal. The groups are usually small, from 6 to 12 people. The format always allows for a question and answer period.

WHAT DO NEW-HIRES NEED TO KNOW ABOUT?

Over the past few years, seminar topics have remained fairly stable. Most fall into the categories of:

- how Publications is structured and how it fits into the company picture
- what tools and resources do technical writers have at their disposal
- how do writers go about performing their assignments

The best way to show how these seminars meet writers' needs is to describe some of the major topics. The topics below have been the best received.

How Publications Is Structured and How It Fits in IBM

The first topic the seminars cover is how the local Publications area is split up. New-hires learn which products the different departments cover and who is responsible for them. With this information, they know whom they can go to for information on a particular product or for help with a problem.

The larger site-wide orientation cannot cover each group and its responsibilities. It is in the local Publications' orientation series that new-hires learn where the job of information development fits in the typical development schedule. These sessions stress the importance of good documentation and Publications' role in a project.

The Writer's Role—From Writer's and Manager's View

New hires need to know just what their jobs entail and how management views them. Two volunteers present this session.

A Publications manager describes:

- what management expects from a writer,
- the characteristics of a good writer, and
- the career paths open to writers.

A nonmanagement writer describes:

- the Publications environments. This includes how information developers work as a bridge between developers and customers and how they function as lead writers and planners.
- the different types of manuals Publications produces,
- hints on how to go about writing. This step includes very general instructions on how to go about updating published material. It also offers advice on coping with the frustrations that may accompany any job.

The Writer's Toolbox

This is one of the most detailed sessions of the series. It instructs new-hires on everything from where to find simple office supplies such as staplers and pens to what reference books come in handy on the job. (A dictionary and various manuals on style, indexing, and graphics are the bibles.)

How to Get Started

"Steps to Writing" covers in general the steps a writer must take to:

- get source material
- write a manual
- put the pieces of a manual together.

Information developers have a wide range of sources for material (Figure 2). This seminar discusses how to deal with contacts in the different areas that supply information.

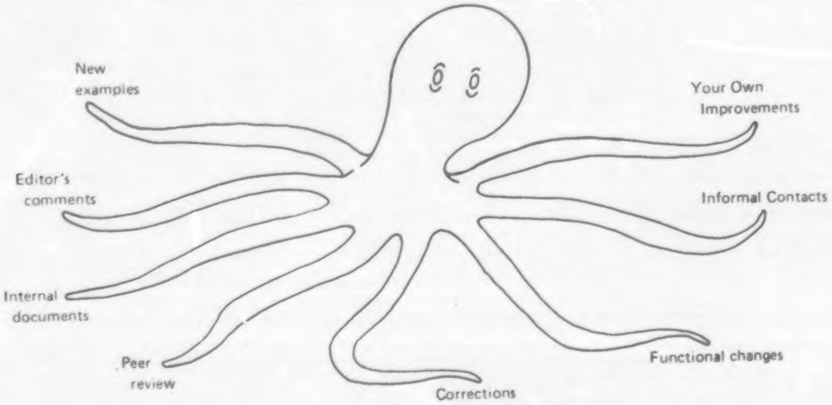


Figure 2. Getting Source Material

New-hires may be new to the type of manuals they will write. The stress they receive in this session is to *think of the audience.* Who will use the manual affects how it should be organized, what *reading level* it should be written at, and what level of information should be included. Among the major guidelines information developers receive are:

- Organize the manual to meet your readers' needs. Don't tell them how to debug their programs if first they want to know how to unpack the machines.
- Don't jump in writing. Plan an outline first and send it out for review. Don't be afraid to change the outline.
- Plan examples early. Before using any example, make sure it really works.

How to Plan a Publications Schedule

When new-hires attend these seminars, they are often involved in their first writing assignments. One of their prime concerns is how to set up a schedule.

This session presents new-hire writers with a sample publications schedule (Figure 3). It mentions all the little "nits" that are easy to overlook, such as:

- how far in advance to book a conference room for an inspection
- how much time to allow for getting draft copies printed
- how much time to allow for review.

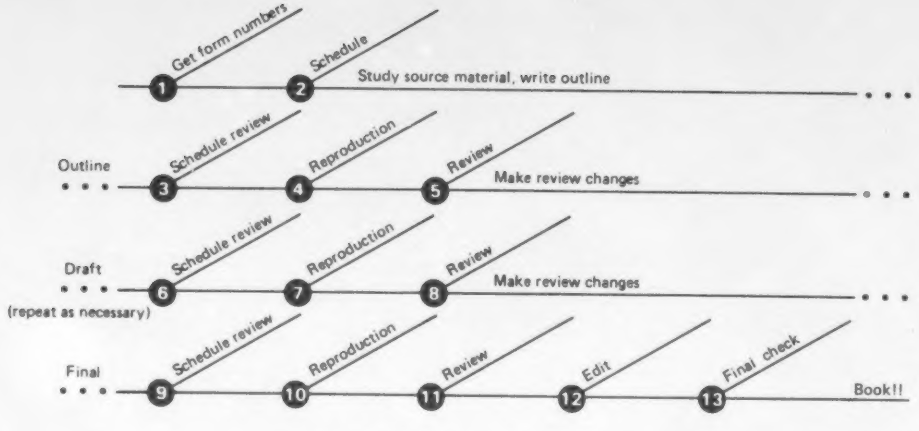

Get form numbers
Schedule
Study source material, write outline
1
2
Outline
Schedule review
Reproduction
Review
Make review changes
3
4
5
Draft
(repeat as necessary)
Schedule review
Reproduction
Review
Make review changes
6
7
8
Final
Schedule review
Reproduction
Review
Edit
Final check
Book!!
9
10
11
12
13

Figure 3. Sample Publications Schedule

While some items in the schedule may apply only to IBM technical publications, many are universal to the process of getting a manual produced.

Looking Back on the First Year

Like many jobs, the first year is usually the hardest. To show new-hires that they can indeed survive, a trio of one-year veterans present guidelines they wish they had known when they first started (and which this group of new-hires have yet to discover). Among the guiding rules to working efficiently (Figure 4):

1. Set your priorities. Do the important tasks first.
2. Be creative. Adapt resources to fit your job. For example, create a form "cover letter" for your drafts and keep it on-line. If you always mail drafts to the same reviewers, have labels printed off the system. Then you don't have to hand address masses of envelopes.
3. Create a realistic schedule. Allow a "fudge" factor for surprises.
4. Do one thing at a time. Develop a way of handling interruptions.

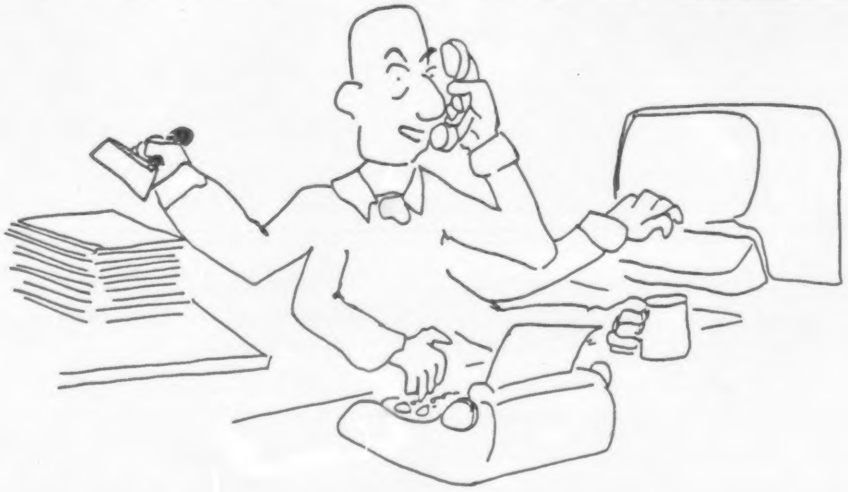


Figure 4. How to Work Efficiently

GETTING FEEDBACK ON NEW-HIRE SEMINARS

No training series can be productive unless it allows for feedback from its participants. At the end of the sessions, new-hires receive an evaluation sheet. Here they have a chance to anonymously critique those presentations they've seen.

Feedback is acted on. An example is the session on planning a publications schedule. It was added after new-hires the previous year asked for a more detailed approach to planning their first writing assignments.

HOW TO START AN ORIENTATION SERIES

Costs for a new-hire orientation can be kept low. All you need invest is the cost of your employees' time to plan for and attend seminars. (Optional is the cost of coffee and danish for the meetings.) The steps you should follow to set up an orientation series are:

1. Find out if there's a need for a series. Pass out an informal survey to recently-hired writers and see if they felt their training was inadequate. The areas that need work are your topics.
2. Find out who is expert on each topic. You should find people willing to put in 2 to 4 hours for a presentation.
3. Plan the series for when your new-hires are free. If seminars come when new-hires are fighting schedule deadlines, they won't be able to give the seminars their attention.
4. Hold the series over as little time as possible. Don't let it stretch out for months.

PEER EDUCATION:
SHARING THE SKILLS IN A TEAM ENVIRONMENT

Kevin G. Minerley
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International Business Machines
Corporation
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NEED FOR SHARING SKILLS

When a company gathers people together as a team or department, each person brings skills necessary to the success of that team. If the manager of the team wants a cohesive unit, the manager must both guide the education of team members and ask team members for help in this education. Managers need to make certain their team members have knowledge of, even some cross-training in, the other members' skills.

Team members need cross-training because other members of the team do get sick, do attend meetings, and do any number of other things that take their individual skills temporarily away from the team. To make certain someone on the team can handle almost any "normal" business crisis, everyone needs cross-training. Here are two sample situations:

Without peer education

1. The planner goes on vacation for three weeks.
2. A new team member needs information that the planner controls.
3. The team member must go to the manager to learn how to access the department information.

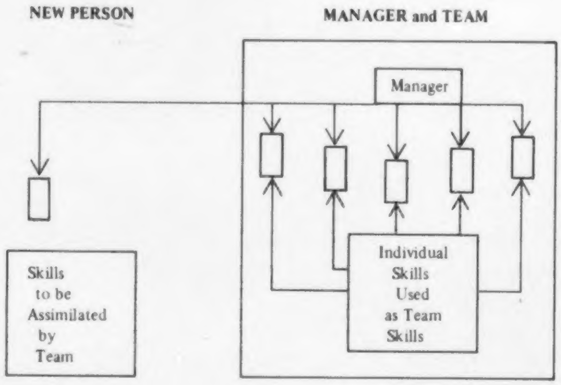
RESULT: Both the manager and team member lose time. The situation can easily occur again.

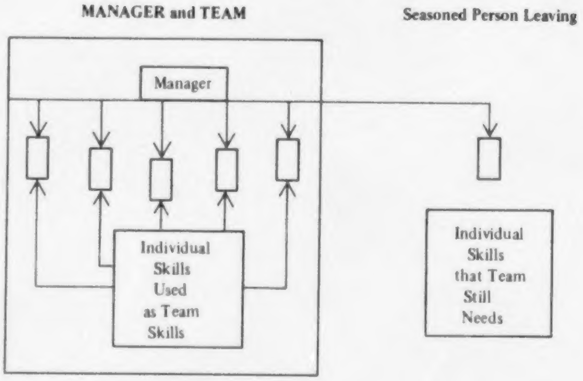
With peer education

1. The manager and the planner see that other members of the team should learn how to access department information.
2. The manager and planner develop a formal class to teach the team how to access the department information.
3. The manager and the team keep the methods of the accessing the department information alive by having team members teach other members.
4. The planner goes on vacation for three weeks.
5. A new team member needs information that the planner controls.
6. The new team member asks any other team member for help in accessing department information.

RESULT: The new team member does not have to look specifically for his manager. The problem gets solved more rapidly than if no peer education existed.

Since an individual knows best his or her own skills, he or she is the best candidate to teach others about those skills—that is, peer can best learn from peer. The manager, who views the team as a unit, often directs and suggests which team member has skills that other team members need.


NEW PERSON
MANAGER and TEAM
Manager
Skills to be Assimilated by Team
Individual Skills Used as Team Skills


MANAGER and TEAM
Seasoned Person Leaving
Manager
Individual Skills Used as Team Skills
Individual Skills that Team Still Needs

The above diagrams show two times when peer education is most necessary:

- A new team member must get acquainted with other team member's skills and tell them about his or her skills
- An old team member leaves the department—if peer education has been on-going, there is no problem, otherwise transfer of skills may be incomplete.

TYPES OF PEER EDUCATION

Formal and Informal Peer Education

INFORMAL PEER EDUCATION: Informal peer education—asking the closest person how to do what you want to do—probably accounts for a significant portion of the interpersonal communication you do in a day. It is informal because you do it at random times and often only concerns the process of the moment. For these very reasons informal peer education is insufficient. And unless you have an understanding of where the process in question fits into the larger cycle of the team's work, informal peer education is inefficient as well: You will probably ask the same question in a slightly different way again and again.

FORMAL PEER EDUCATION: Formal peer education, on the other hand, happens when the manager or someone in the team realizes that the other members of the team need to know some skill he or she possesses. This person then discusses the need with management and, with management's aid, presents the material in a class or seminar.

The following are two contrasting peer-education situations:

Informal peer education

1. You turn to another team member while working at a terminal and ask how to do a particular job. You get an answer and eventually complete the job. Neither you or the other team member realizes a third team member knows a faster easier way to to the task.

RESULT: People waste time without even knowing it.

Formal peer education

1. The manager and a team member realize there is a new way of doing a common task that is faster and easier than an older method.
2. The manager has this team member with the knowledge teach you and the other team members how to use the method.

RESULT: All team members get their job done more easily.

Types of Formal and Informal Education

PEER AND MENTOR-PROTEGE EDUCATION: Peer education can be distinguished from mentor-protege education. A mentor is usually an experienced worker assigned to provide information to a person who is new on a team—the protege. The mentor is a focus, or dispatching center, for questions.

Although the mentor may be a peer (both the mentor and the protege may have the same job title and "rank" in the business), the mentor is usually slightly higher in the corporate hierarchy or at least has been on the job a considerably longer time.

Although the mentor-protege relationship consists of informal education—the manager makes the initial decision as to which mentor gets which proteges—much of the actual communication between mentor and protege is informal because it is done at random times and concerns the process of the moment. The inadequacy of informal education has already been pointed out.

Because the manager assigns the mentor, the protege often views the mentor as a leader, and a "do as I say" leader—follower relationship can develop. This relationship can create some problems. For one thing, a protege whose access to advice is limited to one mentor is likely to acquire a rather narrow capability. For another, the protege may take longer to start thinking independently.

A peer, on the other hand, is someone who works with, as opposed to leads, other people. A peer is an equal. Communciation and teaching among peers promote a "seminar"-like exchange of information. Everyone involved has equal responsibility in the learning process. Consider the following situations:

Pure mentor-protege

1. The protege learns something other members of the team should know during the course of her work, but does not tell others or her mentor because she figures her mentor and the other mentors already know the information.

RESULT: The team misses out on information it needs.

Mentor-protege plus peer education

1. The protege learns something other members of the team should know during the course of her work, comes back and discusses what she learned that day with other team members. She finds out that other team members do NOT know what she has learned.
2. She discusses her findings with her mentor. If the information is brief enough, the mentor and protege informally disseminate the information. If the material is complex. The mentor, protege, and manager determine if a class would be worthwhile for the team.

RESULT: Needed information picked up through casual contacts is given to the team quickly and systematically.

Not only, then, does peer education increase the motivation of the individual team member, it enhances cooperation among all members of the group.

FINAL RESULT

Blend formal, informal, mentor-protege, and peer education to have an efficient, communicative, and professional team. It's good for business.

THE VM VOICE:
HOW TO TELL THE COMPUTER TO PRODUCE THE BOOKS WE SEE IN OUR MIND

Sue Spinner-Vincent
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Data Systems Division
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Kingston, New York 12401

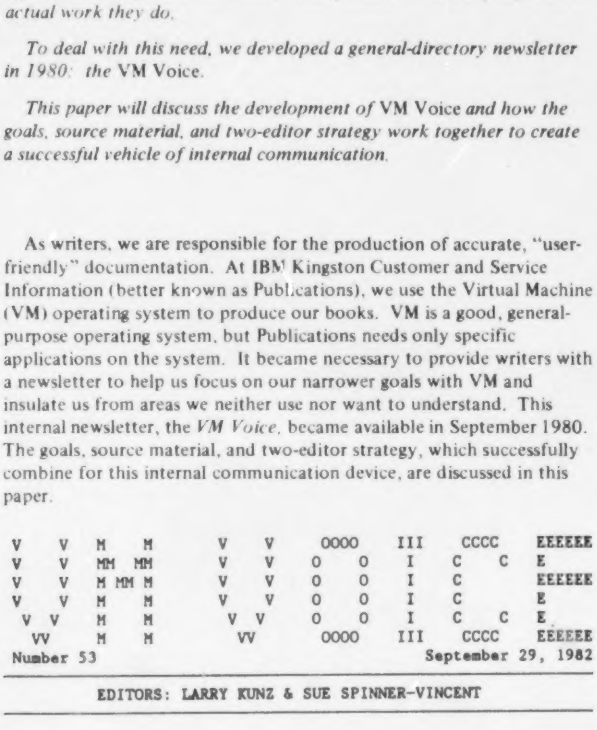
The task of the information developer is to produce accurate, clear and concise, "user-friendly" documentation. The tool we use to accomplish text processing at IBM in Kingston is the Virtual Machine (VM) operating system.

VM and its applications are excellent products, but information developers generally need to know only a small portion of their numerous capabilities. Typical information developers want to employ VM and its editor and formatter programs to produce hard copy that resembles the book they envision in their minds. They usually do not have the spare time or motivation to experiment with all the functions available on the system. Indeed, they want to be "protected" from information they don't use. They want pointers that are specific to the actual work they do.

To deal with this need, we developed a general-directory newsletter in 1980: the VM Voice.

This paper will discuss the development of VM Voice *and how the goals, source material, and two-editor strategy work together to create a successful vehicle of internal communication.*

As writers, we are responsible for the production of accurate, "user-friendly" documentation. At IBM Kingston Customer and Service Information (better known as Publications), we use the Virtual Machine (VM) operating system to produce our books. VM is a good, general-purpose operating system, but Publications needs only specific applications on the system. It became necessary to provide writers with a newsletter to help us focus on our narrower goals with VM and insulate us from areas we neither use nor want to understand. This internal newsletter, the *VM Voice*, became available in September 1980. The goals, source material, and two-editor strategy, which successfully combine for this internal communication device, are discussed in this paper.



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V   V  M   M      V   V    OOOO    III    CCCC    EEEEEE
V   V  MM MM      V   V   O    O    I    C    C   E
V   V  M MM M     V   V   O    O    I    C        EEEEEE
V   V  M   M      V   V   O    O    I    C        E
 V V   M   M       V V    O    O    I    C    C   E
  VV   M   M        VV     OOOO    III    CCCC    EEEEEE
Number 53                                 September 29, 1982
------------------------------------------------------------
          EDITORS: LARRY KUNZ & SUE SPINNER-VINCENT
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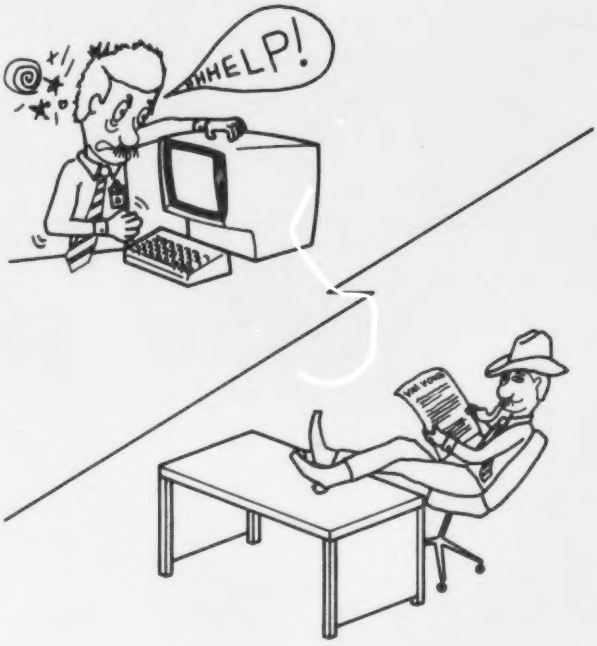
Before the *VM Voice* came into existence, there was a need to convey important information to all the IBM Kingston writers. There was no common means to share personal discoveries of the trade, collect feedback, and present new functions and commands. Seemingly unrelated facts needed to be tied together and tailored for a group with varying levels of experience. This information had to reach everyone without burdening the less experienced or wasting the time of the experienced writers.

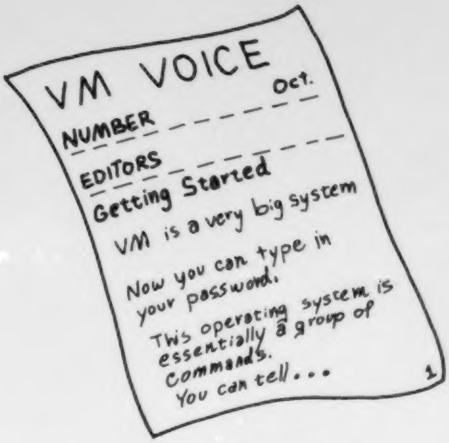
GOALS

Educating New Writers

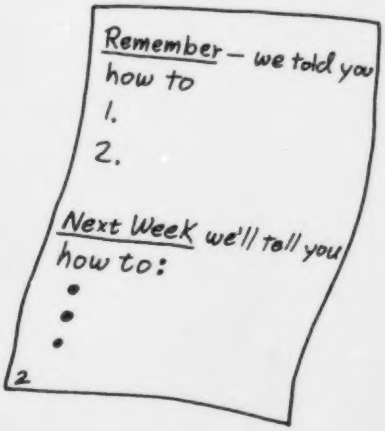
New writer education is an integral part of the *VM Voice*. Early issues cover the essential basics that make this machine work. Topics range from step-by-step instructions on how to sign on to the system, how to use the system's text-processing editors, and writing execs (mini-programs) to what to do when the system goes down. A new writer, relaxing after a crash course on the system, can sit down at a terminal and pace him/herself with a leisurely lesson from the *VM Voice*.



An example is the first issue, which carefully takes you through the procedure for signing onto the system. The instructions lead the inexperienced terminal user through this process simply and painlessly.


VM VOICE
Oct.
NUMBER
EDITORS
Getting Started
VM is a very big system
Now you can type in your password.
This operating system is essentially a group of commands.
You can tell . . .
1

At the end of the issue, you are reminded of the information you have learned and are given the topic planned for the next issue. This gives the reader an idea of what to expect and gives the editors a focal point for the next time they work on *VM Voice*.


Remember – we told you how to
1.
2.
Next Week we'll tell you how to:
•
•
•
2

Sharing Shortcuts with Our Peers

When someone in our area discovers a trick or a shortcut that might be useful, the information is submitted to be shared with all the readers.

VM VOICE

How to Contribute to VM Voice
A lot of people have contributed to VM VOICE. . . . .

Figure 1. Contributions Welcome

Informing Writers of Developments

Developments in our text-processing language come through as system messages or memos. These changes or additions might cover items that we need to add to our profiles (individually tailored parameters governing our interaction with the system), or they could be something that we have to do daily when we use the system. Information worth repeating and documenting is also included. The *VM Voice* often covers these developments for the users at Kingston Publications.

New tools (text-processing programs) are added for all of the writers to use. We are notified by an online message, and *VM Voice* has a follow-up with an extended explanation of how to use it. There are some functions we can perform simply by typing their names on the screen and filling out menus. PHONE is an example of such a function; the *VM Voice* explained the use of this online internal company phone book as soon as it became available.

Preparing for System Changes

Sometimes system updates, or migrations, take place, and writers must be informed in order to have adequate preparation time. These changes are normally minimal, but the writers need to know what will take place and when the system will be available for use lest these changes interfere with their online work. They are informed by *VM Voice*.

We are implementing a five decimal code to initialize your subsystem center. Migration begins on Friday, March 13th at 1600 hours.

Figure 2. A System Message

VM VOICE

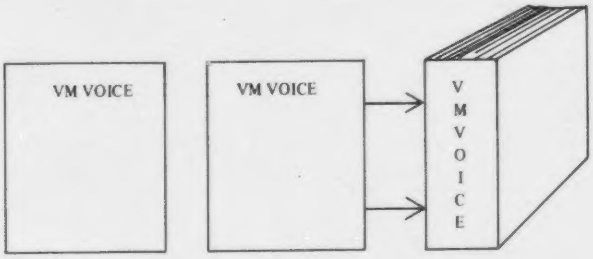
WE'RE MOVING AGAIN

On Friday, March 13, we're migrating again

Figure 3. VM Voice Clarification

Providing an Informal Reference

In general, the internal-use-only *VM Voice* is gradually growing into an informal reference manual. The information covered is indexed and easy to use. Some of the topics are brief, whereas others are extended over several issues. It doesn't matter how many or how long. The point is that the important material is covered without exhausting the user with lengthy chapters on how something is done. He or she is gradually eased into the material. By the time the last portion of a subject is released in a given edition, the user is totally familiar with the subject. All he or she has to do is sit down at the terminal with the latest edition and learn the new part. If the writer keeps every issue of *VM Voice* in a binder or a folder, the information is always on hand for reference.



SOURCE MATERIAL

The editors of *VM Voice* use several sources of information. Some of the sources have already been described, such as the suggestions of other writers and online system notices. The rest comes from brainstorming.

Classes and Reference Library Material

On occasion, classes are offered for new techniques you can do on VM, and something new always comes up. The *VM Voice* editors take notes during these classes, condensing the information for everyone to understand.

If something is worth documenting so that understanding can be improved, even if a reference manual already exists, the information is condensed for easy use and explained in comprehensible terms.

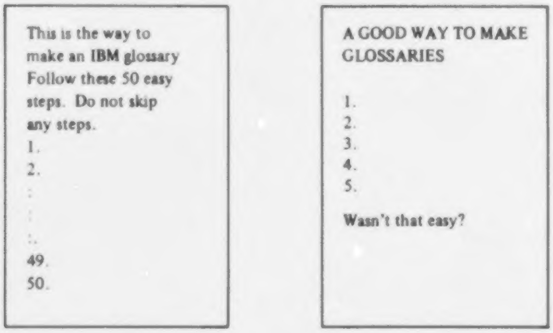

This is the way to make an IBM glossary
Follow these 50 easy steps. Do not skip any steps.
1.
2.
:
:
:.
49.
50.
A GOOD WAY TO MAKE GLOSSARIES
1.
2.
3.
4.
5.
Wasn't that easy?

Figure 4. Lengthy Documentation/VM Voice Version

Peer Input

A major source of information is peer input. Suppose everyone must perform a complex procedure just to get a printout. Writers complain that they forget what to do, and they look for the one person who always remembers the magic formula. It's just as easy to print the information in a newsletter so that everyone has a copy and can look up what they need. The editors rely upon their fellow writers for this input.

TWO-EDITOR STRATEGY

The *VM Voice* has been successful for many reasons. One reason is the two-editor staff. Both of the editors are writers for IBM Kingston Publications. One editor has a background in English and communications but no computer science. This person is well suited to champion the user's point of view. All the writers want to do is produce their work with little difficulty. They don't care *why* something happens. This editor sees that the newsletter comes across to its readers simply—without theory and excessive explanation—and can easily determine what might be confusing.

The other editor is more technically oriented and knows the ins and the outs of the VM machine. This person can answer questions that come up and organize the information into digestible and understandable reading. The two work together to create an enjoyable and very useful newsletter.

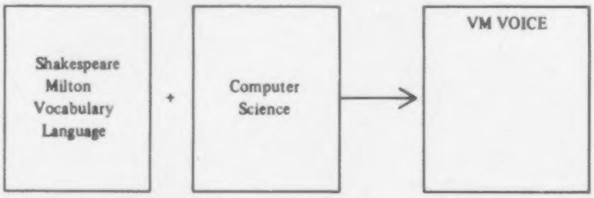


Figure 5. Two-Editor Success

CONCLUSION

The *VM Voice* newsletter has proven to be a widely used communications device at IBM Kingston Publications. *VM Voice* has significantly increased writers' understanding of the use of the system. The success of this newsletter comes through maintaining the goals set forth when it was first developed. The information continues to come from a variety of contributors and is developed through the skills of the editorial staff.

HOW DO YOU HANDLE THAT, TONY?
A COMPARISON OF MANAGEMENT STRATEGIES

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This panel will provide a forum for discussing management strategies. The two panel leaders represent two apparently very different management environments:

1 An old-established, in-house publications department in a large company manufacturing farming equipment based in the Canadian prairie.
2 A relatively young, small independent publications company serving a many small companies manufacturing a variety of high-technology equipment based on the U.S. east coast.

On the other hand, both panel leaders believe they function as humanitarian leaders rather than as authoritarian managers.

In discussing various management issues, the two panel leaders will bring out the differences and similarities between their two styles. The audience will be invited to participate in the discussion to the greatest extent possible. In fact, the two leaders regard their function as more catalytic than analytic!

The exact topics that will be discussed, and the detail to which they will be discussed, will depend on the interests of the audience. Following are some of the topics that we anticipate:

Personnel:
- deciding on staffing levels
- hiring and firing policies and procedures
- grievance procedures
- handling disciplinary action
- professional disagreements
- personality conflicts
- performance assessment

Facilities & equipment:
- selection
- training procedures
- operation procedures
- selecting and using vendors

Scheduling and Budgeting:
- assigning tasks and responsibilities
- establishing budgets
- tracking completion
- tracking budgets (cost accounting)
- dealing with schedule and cost overruns

Publications Quality Control:
- meeting deadlines
- meeting budgets
- editing and proofreading
- technical review
- "understandability" (readability, effectiveness, psycholinguistics, etc.)
- audience analysis
- field trials
- assessing effectiveness

Overall Management:
- long-term planning
- making policy
- internal communication
- group organization
- management theories (X, Y, and Z organizations; leadership vs management; group/corporate philosophy; etc.)
- office politics
- teamwork
- group/corporate image (public relations)

Marketing and Sales:
- selling (to "clients", who may be other departments of the same company)
- group/corporate image
- educating clients
- resolving problems with clients
- communicating with clients
- assigning responsibilities: clients/staff

Personal/Professional Development:
- from the employee's point of view
- from the group/corporate point of view
- education
- professional affiliations
- awards
- personal value (Batten: "The ultimate value of each individual is the sum of the values between his/her ears.")
- value of an individual as a team-member

IMPROVING THE EFFECTIVENESS OF TECHNICAL DOCUMENTATION THROUGH ANALYSIS

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The ultimate goal in the creation of a technical publication (specifically a user's guide) is to produce the most effective tool that readers can use to find out what they need to know in order to do what they need to do. Whereas many technical publications are well-written, accurate, and completely thorough in their description of a product or service and its use, they may still be ineffective as a reader tool because they fail in one or more of the following areas:

- . audience orientation
- . readability
- . useability
- . company orientation

This paper presents an approach developed at General Electric Information Services Company to measure and determine publication effectiveness before going to press, by analyzing all facets of a publication against an established set of criteria for consideration under each of the four areas mentioned above. Additionally, it presents several techniques that have been implemented as a result of this analysis to enhance effectiveness.

HOW IT BEGAN - SOME BACKGROUND INFORMATION

Fine tuning our documentation is an on-going process at GE Information Services, not only from the standpoint of making more effective tools for readers, but also making them more cost-effective from our point of view as the publisher. Over the years we have implemented numerous style and format changes both as a response to audience requirements and to technological developments that allowed us to shorten the production process and reduce costs.

As part of this process, a special project was established to examine the publications of other companies in our industry (computing services) to see what they were producing in the way of documentation for products and services similar to those marketed by us. The idea was not only to see how we stacked up against the competition, but also to identify fresh ideas and new approaches that we might want to implement.

The project was a success in that we did discover some areas in which we could improve our publications. But the biggest payoff was that we could apply the method of analysis to our publications as a matter of procedure to ensure that they were as effective as possible before we invested a dime in production costs.

The remainder of this paper describes our method of analyzing publications, the criteria used, and several recommended techniques that have proven to be quite effective. As you will see, the analysis is neither complex nor especially time-consuming, and can be easily adapted by almost any documentation organization.

THE PERSPECTIVE

Because we work on the premise that the effectiveness of any publication is determined by the audience for which it is written, our entire analysis is approached from the reader's point of view. Based on that point of view, four things must be achieved:

1. Audience Orientation

   Are reader needs perceived and fulfilled?

2. Useability

   Can readers easily find the information they need?

3. Readability

   Is the presentation of information clear, friendly, and easy on the eye?

4. Company Orientation

   Will the publication give the reader a positive image of our company?

THE CRITERIA

Having established the perspective from which we would analyze publications, our next step was to establish the criteria which, if satisfied, would enable us to answer YES to the key question associated with each of the four areas. If not satisfied, the manuscript would be returned to the writer for the necessary correction or improvement.

The following paragraphs list the criteria for each area and present several recommended techniques for satisfying them as well as some things to avoid. Much of this information came as a direct result of our analysis of industry publications.

As you will see, when the analysis is completed, virtually every facet of the publication will have been examined.

AUDIENCE ORIENTATION

To be effective, we must obviously know our audience. We must know who they are, what they do, what they already know, and what they need to know. Without this information, there is really no need to proceed. Using the criteria below, audience orientation is the first area we check.

- . Is the audience clearly defined?
- . Is the intent of the publication clearly stated?
- . Are there specific instructions on how to use the publication?
- . Is there a reference to related information?
- . Has all superfluous information been deleted?
- . Have we solicited the reader's feedback?

Effective Solutions

Not only is the information specified in the criteria essential, it must be presented immediately. We found that a uniform, one or two page introductory section in each publication is the best way to handle it. In a matter of minutes, readers will know if the publication is written for them, the level of knowledge they are assumed to have, the precise tasks they will be able to accomplish by reading it, how to use the publication, and where they can find additional information or help if they need it.

It's a good idea to make this the first section or chapter of the publication rather than including it as part of the standard front matter. Use a title such as IMPORTANT INFORMATION ABOUT THIS BOOK. Very few readers ever look at pages titled PREFACE or FOREWORD.

We also found that in some cases we were giving readers more information than they needed or wanted. Although tempting to include, lengthy descriptions about the technical expertise that went into a product's development or the need that created it should be avoided. Our reader likely already has the product and wants most of all to know how to use it.

Including a convenient reply card soliciting reader comments is a good idea. It shows an interest in reader opinion and can lead to some worthwhile suggestions. This becomes even more effective when followed up with a phone call or memo to the reader with your plans to follow up on the suggestion or comment.

USEABILITY

The next area we examine is the useability of the publication. Finding needed information should not be hard work. Our criteria for ensuring a useable publication are as follows:

- . Is there a table of contents covering all level of heads?
- . Is there a detailed index?
- . Is information organized and presented functionally?
- . When examples are used, do they stand out? Are they well annotated?
- . Have we agreed upon the most useable form of packaging/binding?

Effective Solutions

Publications over 16 pages without a table of contents and/or index are automatically rejected for production. However, in addition to the traditional index, we sometimes place a thumb index or a subset of the inside index on the back cover for quick reference to key items.

A running head appears at the top of each page of text letting readers know at a glance exactly which section of the book they are in.

A most effective means of presenting examples was implemented as a direct result of our analysis of other company publications. This method is to print the example, by itself, on a page facing the step-by-step explanation of what the example shows. This discovery came with a special bonus. By showing examples in this manner, we were able to drop the screens that we had been using to highlight them, resulting in a significant cost savings.

Heads are checked for functionality. If we are presenting information on how to use a command driven system to enter transactions into a data base, the heading for that particular paragraph or section should be "HOW TO ENTER A TRANSACTION INTO THE DATA BASE", rather than "THE ENTER COMMAND".

Organization is a key to useability. The most effective organization will depend on what your reader wants to do. Sometimes moving from simple to complex tasks works best. In other instances the best organization might be to cover the things most frequently done first. At any rate, it's always good to get readers up and running and using the product early in the book.

As far as packaging or binding is concerned, there are always trade-offs to be considered. Saddle-stitched and perfect bound publications are easier to carry and easier to use. Loose-leaf bound publications are easier to revise, but usually require a controlled distribution. The cost of binders is also a key consideration.

Our analysis of previously published documents gives us some insight into this area. Some publications which are excellent in every other aspect can fail the useability evaluation because of their packaging. In one case too many pages stuffed into a loose-leaf binder made it difficult to turn the pages and resulted in several torn pages. Another had tabs extending beyond the cover. They soon became dog-eared and bent, rendering them useless.

On the other hand, we discovered that small-sized publications (about 8" x 6") are convenient to handle and use. As a result, we have produced some user's guides in that approximate size (a terminal operation guide for a mini-terminal was published in the same size as the terminal and distributed with the terminal).

Price lists and abbreviated product indexes designed for handy reference are produced in pocket-size volumes.

Consider packaging carefully. It can enhance publication useability as well as attractiveness.

READABILITY

Even the most useful information is of little value if it is difficult to read or follow. Our criteria for readability are as follows:

- . Have we selected a readable typeface?
- . Is the page layout effective (use of white space, heads, line length)?
- . Is the tone friendly?

Effective Solutions

Serif typefaces are more readable than sans serif. We typeset text in 11 pt. Baskerville or 10 pt. Press or Times Roman. Heads are usually set in boldface 11 pt. Helvetica, a sans serif font which creates a rather pleasing counterbalance to the text font.

We don't typeset many internal publications because of the cost considerations. However, these publications are produced by running off text files on a letter quality printer using a 10 point Courier element. The results are still highly readable.

When laying out pages, we try to eliminate extremely long passages of text that go unbroken for pages without a head. Shorter line lengths (less than 6" in an 8½ x 11" book) enhance readability as do ragged right rather than justified lines. Use of double columns can be attractive, but they are also difficult to follow and more expensive to revise.

As far as friendliness goes, we've found a couple of things that work quite well. Our user's guides are written in the second person which is much friendlier than the often seen third person. Readers like to be spoken to directly. How often have you read a cookbook that refers to the reader as "the cook?"

Jargon should be avoided wherever possible.

COMPANY ORIENTATION

This is often overlooked as a category to be considered in publication effectiveness, but is indeed a key area for consideration. We want our company to be favorably perceived by our readers. Consistently effective and superior documentation can play a major role in the customer's satisfaction with a particular product. Here are some things we look for:

. Is the cover effective?
. Is there a "family look?"
. Have we made good use of inside covers?

Effective Solutions

The front cover should contain, at the minimum, the title of the publication, type of publication, publication number, and prominent visibility of the company name. An attractive design that can be used on all company publications will create a "family look", giving your company publications a readily identifiable image.

Inside covers are a great place to advertise or promote other products and services, other publications, training courses, etc. The pages often go unused, but they can serve your company well.

THE EVALUATION - BUILD A CHECKLIST

The easiest way to evaluate your publications using this type of analysis is to create a checklist of your criteria. Categorize criteria in a way that makes sense to you and make several copies of the list.

As you make your review, check off any criteria that are not satisfied. Add whatever comment or suggestion you may wish to include and return the manuscript to the writer who can then make the necessary improvement.

SUMMARY

Publications can be analyzed for effectiveness by measuring them against criteria in four areas: Audience Orientation, Useability, Readability, and Company Orientation. By identifying, before a publication goes to production, facets that miss the mark, you can greatly reduce the chances for having to do expensive revisions or supplements, create a positive image in the eyes of your readers, and reduce the number of calls requesting clarification of documentation.

Make your own checklist of criteria and, if you don't have one, produce a style guide that will assure the automatic inclusion of effective techniques.

O.K. Let's go to press!

THE PROOF OF YOUR EDITORIAL PUDDING IS IN ITS TASTERS

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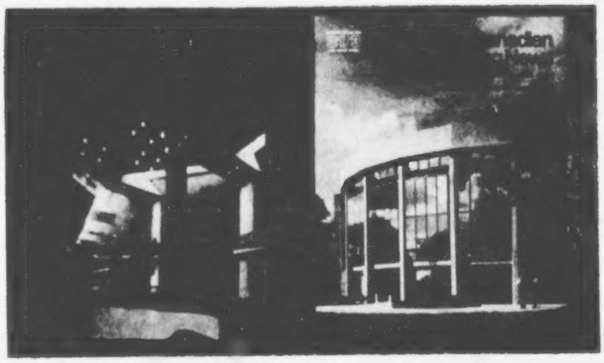
One of the biggest problems facing an industrial publications editor is how to convince management that his or her publication is effective and is doing the job that the company or publishing organization is paying to have done. In my experience as an industrial editor, I found that the way to convince management of the effectiveness of a publication is to continuously "sell" the publication to management, and periodically support one's efforts with an independent editorial survey. This paper discusses the importance of the editor periodically evaluating his or her own publication, gaining confidence in his or her work and convincing management that the publication successfully meets or exceeds all required goals. The paper suggests that the most valuable tool in selling a publication's performance to management is a periodic independent editorial survey conducted by a marketing research company. A case history of one such survey is described in its implementation and results.

One of the biggest problems an industrial publications editor has is how to convince management that his or her publication is effective and is doing the job that the company or publishing organization is paying to have done. In my experience as an industrial editor, I found that the way to convince management of the effectiveness of a publication is to continuously "sell" the publication to management, and to periodically support your efforts with an independent editorial survey.

Wait! Don't stop reading! An independent editorial survey isn't as frightening as it seems. If you are confident that you and your publication are doing a good job, then a survey is more than likely going to show results that are better than you dared hope for. If you aren't confident that your publication is doing a good job, then it's time to update your resume and start looking at want ads.



I am editor of two architectural construction trade magazines published by United States Gypsum Company: FORM & FUNCTION and CANADIAN BUILDING NEWS. Both are quarterly 16-page periodicals, printed in four-color process on high-quality paper. FORM & FUNCTION has a controlled circulation of about 120,000 and CANADIAN BUILDING NEWS, about 17,000. Their purpose is to act as sales aids to company representatives in promoting the company's building materials products and systems, to enhance the company image of having quality products and technical expertise, to show architectural readers how to use company products and how to design with them, and to provide useful state-of-the-art design information about contemporary construction projects.

The FORM & FUNCTION mailing list consists of approximately 60% architects and other specifiers, 20% builders, general contractors and building owners, and 20% subcontractors and other users. The audience for CANADIAN BUILDING NEWS is similar, but with the addition of home builders and building materials dealers.

Fifteen years ago, when I became editor of CANADIAN BUILDING NEWS, one of my first tasks was to propose a budget for the magazine to the president of Canadian Gypsum Company, Ltd., a Canadian subsidiary of United States Gypsum Co. and publisher of CANADIAN BUILDING NEWS. The first thing he asked me was "What did CANADIAN BUILDING NEWS do for us this year and why should we continue publishing it?" After recovering from the shock imposed by such a question, I attempted to answer him. However, every year after that (until

Plaster & drywall mak
First Place finishes

he retired) he asked me the same question, and each year I came up with a better, more thought-out answer. Eventually, I understood how much he was helping me by asking that question and making me think about performance.

While it is a basic rule, some editors forget to periodically review the purpose, scope and audience of their publications. Besides conducting this soul-searching exercise at least annually, you must incorporate your results into your publication in order to keep it from stagnating. Also, you must periodically review your understanding of purpose, scope and audience with your management to assure that you are giving them what they expect.

Once you are confident that you know your publication's purpose, it's easier to go ahead and direct your efforts to achieving your purpose as well as your capabilities permit.

The whole exercise of continuously evaluating your publication and reviewing your evaluation with your management should go a long way toward satisfying them that you are indeed achieving your purpose. If you really are achieving your purpose and doing it well, you probably can provide supplemental support by showing unsolicited complimentary letters, solicited comments, awards (such as from STC), personal evaluations, etc., to management periodically.

Every so often, however, management needs "absolute" proof of your publication's success. Since most publications don't develop direct sales or even tangible leads, it isn't easy to show unquestionable proof. That's where the editorial survey comes in.

It is unlikely that your management will be convinced by a survey conducted and evaluated by the editor. It may be tainted by your deliberate or subconscious self-serving evaluation of the results. Even an objective survey may contain wording that draws respondents to your conclusions. Thus, even the most honest and objective survey falls under question if it is conducted by the editor.

An "independent" survey, conducted by a market research company costs in the range of $5,000 to $20,000, depending on the size of your publication, diversity of its audience and amount of information you want to develop. However, this is a small price to pay for the credibility that the results will have with your management. From management's point of view, it is a relatively inexpensive way to confirm the wisdom of an expensive publications program.

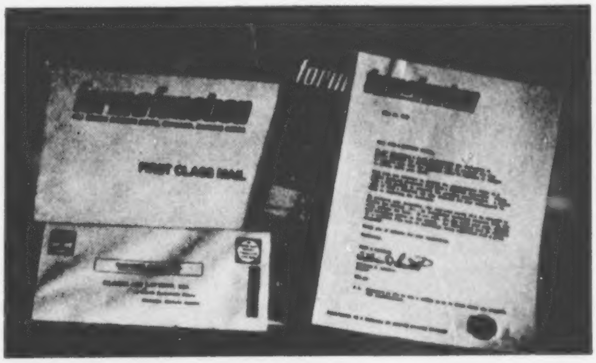
We decided to conduct such a survey four years ago because management felt our claims of success were a little extravagant. We were claiming that over 50% of our then 70,000 circulation was reading FORM & FUNCTION and being influenced by its contents. We even claimed that over $100 million of our $1.5 billion annual sales were indirectly influenced by the magazine.

Management consented to hire a marketing research firm to do a survey to verify readership levels. I was closely involved in the planning to determine what we wanted to know, what segments or groups on our list we wanted to contact and what kinds of questions would be appropriate.

We decided that four major groups were to be surveyed and that valid results required at least 100 responses from each group. Thus we mailed 400 surveys to our primary readership (architects). Although the research firm suggested that 15-20% was a normal response rate, we expected (and got) a higher rate from this group and lower rates from the other three groups. We mailed 800 surveys to each of the other three groups: general contractors, builders and subcontractors. Names were randomly selected by machine searches of our mailing list. For instance, to select 400 architects from the 33,500 on our list, we printed out each 84th name; for 800 builders from our 11,000, we printed out each 14th name. By using a list stored in zip code order, we were assured that all geographic areas would be sampled. Thus, all results were listed by group and by region to determine if a good or bad response was larger or smaller in a particular region or group.

The surveys sent out were worded the same for all groups, but color-coded for ease in sorting. The surveys asked respondents to provide us with the names of the states their businesses were in so that we could list our results by region. Besides obvious questions concerning degree of content read and perceived value, we also asked whether readers saved each issue, whether they wanted an index to past issues, what kinds of articles they liked and wanted more or less of, and whether they would like to see the magazine expanded. The surveys suggested an anonymous response, but provided a sizable area to permit them to make additional comments and/or sign their names.

A recent issue, chosen on the basis of general quality and variety of content, was enclosed for reference. A cover letter, signed by the editor, asked readers to fill out the survey and noted that there was a quarter (25¢) attached to buy them a cup of coffee to drink while they filled out the survey. The survey package



was mailed out in our envelope so that any postal returns would come to us, but an envelope addressed to the research firm was enclosed to show readers that the returns were being analyzed by an independent company. This was a technique intended to eliminate the built-in bias that might suggest to readers that they provide answers that they thought we wanted to see, if the surveys were returned to us.

The results couldn't have been better. We felt that if 25-50% of our readers read at least part of each issue, and if that same percentage found the magazine to be of value to them, our program could be considered a success. We also felt that a 50% readership rate was about the most we could hope for even if the publication was produced by an outside publications specialist. Our results showed, however, that a total of 80% of our readers read the magazine to some extent: cover to cover, most contents or certain articles; and only 20% skim through. The highest rate was for subcontractors (93%) and the lowest was for architects (69%). Regionally, the highest readership was in North Central states (86%) and lowest in the West (75%). In terms of perception of value of our contents, the total of those finding the contents always valuable (15%), frequently valuable (42%) or occasionally valuable (38%) was an amazing (94%). Only in the category of general contractors did more than 6% find the magazine seldom valuable. The "value" results ranged from 96% for architects and builders to 89% for general contractors; regionally they ranged from 99% for North Central to 93% for South.

The high percentage of readers finding the magazine of value was especially significant since it indicated that even those who only skimmed each issue perceived value in what they read -- probably in photo captions. That means that in the case of our magazine, skimming or reading selected articles is of value to them and us. More than 25% (33% of architects) keep a file of certain articles or entire issues, thus indicating a need for a regularly published index. In the reader evaluation of contents, a majority of architects desired more technical articles, and all groups except architects wanted more brief articles on new products or product changes. In nearly all categories of articles all reader groups wanted either the same number or more articles presented. The only exception to this was the category of articles on projects in foreign countries -- 60% of readers wanted fewer of these. However, apparently readers didn't consider Canada a foreign country, because 52% wanted more articles on Canadian projects.

Besides the fact that management was persuaded that FORM & FUNCTION Magazine was doing a superior job of meeting its objectives, there were other benefits to the survey program. Many people became convinced that we knew what we were doing and should be permitted more freedom in running the program. The survey indicated a need for more of every type of article and resulted in an expanded issue of our publication. An independent business reply card survey in conjunction with the expanded issue produced a 99% approval rate (adopt new format versus retain old format). Unfortunately, as a result of the recession, we have indefinitely postponed the expanded format. On the other hand, as a result of the increased confidence in our publication, management has permitted us to nearly double our circulation over the past three years, to a total of 120,000.

I can't guarantee that if you arrange for an independent readership survey your results will be as good as ours were, but I do believe you'll be pleasantly surprised.

MANNER IN WHICH RESPONDENT READS FORM & FUNCTION	TOTAL	OCCUPATIONAL CLASSIFICATION				REGION			
	%	Arch. %	General Contr. %	Bldrs. %	Sub-Contr. %	North East %	North Central %	West %	South %
Cover to Cover	14	6	15	12	25	17	12	17	13
Most of Each Issue	27	24	28	27	30	27	31	15	31
Certain Articles	38	39	31	44	37	38	43	43	33
Skim	20	31	26	18	8	18	14	25	24
TOTAL	100	100	100	100	100	100	100	100	100
Number of Respondents	415	133	74	85	123	89	117	60	124
VALUE OF FORM & FUNCTION									
Always Valuable	15	6	20	12	24	24	15	15	8
Frequently Valuable	42	50	44	35	36	37	41	42	46
Occasionally Valuable	38	41	25	49	34	33	43	37	38
Seldom Valuable	6	4	11	4	6	7	1	7	7
TOTAL	100	100	100	100	100	100	100	100	100
Number of Respondents	413	133	73	85	122	89	117	60	123

EVERYTHING YOU EVER WANTED TO KNOW ABOUT YOUR PUBLICATIONS' EFFECTIVENESS...
(BUT WERE AFRAID TO ASK YOUR USERS)

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This paper deals with the formation and functions of one of the first (if not the first) Publications Advisory Committees to have user involvement. Included are some topics already addressed that are applicable to any technical publication.

First – don't be afraid to ask the people that use the publications. That's how one of the data processing industry's first, if not the first, publications advisory committees was formed. The problem of determining just what works and what doesn't isn't new. It's only recently that it's been brought out of the closet.

One company decided to confront the issue. It requested the help of its user base to improve the quality of its technical publications. The management realized (finally) that it doesn't matter how good equipment is or how good software for that equipment is if the customer cannot decipher the instructions to make it work. This breeds frustration and can ultimately cause loss of revenue when that customer seeks the solution to his problem elsewhere.

The user representatives responded by funding a committee of five and asked the vendor to provide comparable staffing. This has been done. The building of credibility on both sides is progressing nicely.

The areas addressed by the committee are clarity, accuracy, organization, completeness and usability. We request suggestions related to those areas from the entire user base. Since it is a user-based committee, the suggestions are directed to the individual user with the experience in the area of the suggestion. The item is first reviewed to determine if the suggestion really relates to the publication or if it should be directed to a similar committee formed to address software suggestion.

After the initial screening, the suggestion itself is evaluated. Each member of the committee has been provided a full set of reference manuals in his area of expertise. These manuals are constantly updated to have the most current information possible available for research. If necessary, the submittor is contacted for clarification.

The suggestion will then be evaluated by the committee member. He will form his own opinion and include it in his report.

There are three possible actions by the committee. The committee can recommend the suggestion to the vendor. The suggestion can be held for further investigation or the committee can reject the suggestion and state the reason. The action taken is reported to the submittor.

Every item recommended by the user members must have a written status report by the vendor representative by the next meeting. There are four possible actions by the vendor. The item may be accepted without a specified implementation date. The item may be planned and a date scheduled. The vendor may hold an item for more investigation. The vendor may reject a suggestion and state the reason. If the user members feel that a suggestion has merit in spite of the vendor's rejection, it may be recommended again and possibly a compromise effected. The original submittor is told the action taken by the vendor.

This entire procedure ensures that all parties involved in the processing of a suggestion are always informed of its status. A final summary of all suggestions and their status is made in a newsletter that is distributed to the entire user base.

Formal meetings of user and vendor members of the committee are held quarterly. There is also much written and verbal communication among members between meetings.

The users also act as consultants to the vendor representatives on future publications and enhancements to current publications. This may involve reviewing samples of preliminary material and providing a critique. It may also mean giving the user's point of view on what should be included (or excluded) from future reference material.

One area that vendor realizes needs improvement is the example that accompanies a functional narrative. Very often, these samples may be correct syntactically and procedurally, but they aren't practical because they were supplied by the developer and have no relation to a production environment. Our suggestion has had two points. First, show the item to someone other than the developer. If that person understands the verbage and the sample, fine. If not, it needs work. Second, after an item has been in general use, solicit suggestions for better examples from the actual users.

The following editorial appeared in the November, 1982 issue of *"Business Computer Systems,"* copyright 1982, and is reprinted with their permission.

Tell me more--
(dammit!)

"We bought a modem and tried to install it in a computer system. It was not a one-evening job.

There are wheels within wheels here, and the unwary system (self) integrator had better tread carefully. Consider the layers of possible incompatibility. Among other things . . .

The modem must run with the kind of I/O port available. The bit rate and protocol available at the I/O port must match the needs of the modem. The communications software used must work with the modem, and if it is an intelligent modem, yield up the right commands in the proper sequence. And the communications software package must be properly configured for the computer.

So far, we have had trouble with all of the above. In theory, the system should click right together; only a wiring adaptor should be needed in the RS-232C link between computer and modem.

In fact, the documentation which came with the computer, the modem and the software package is so unclear that it is just about impossible for a lay person to tell, for example, which two kinds of RS-232C ports inhabit the back of our computer.

Finally, through trial and error, we whipped up a wiring adaptor that works, but nothing much else does yet. As is, we can connect to a remote data base system, but we can't get their computer to talk to our computer.

(Yes, the baud rate and protocols are properly set – our computer system puts this under "easy" software control; not that there's much of a hint in the documentation about how one exercises such control. We eventually solved the problem using some independent documentation, but only after hours of searching – no index.)

The list could go on. The irritating thing about this affair is that there is no black magic to this business. There is nothing so arcane that a lay person with adequate information couldn't do this job.

If hardware and software vendors expect to serve the exploding market for small business systems, they are going to have to equip the user to use their products. So far, the text on a cereal box often gives more comfort to the user than the average piece of documentation."

From a user's standpoint, there are two kinds of publications: reference manuals and tutorials. They are not the same. A tutorial is used to learn how to do something. It should be written like a cookbook, all necessary ingredients listed first, and the step by step instructions to produce the finished product listed next. Check-off boxes are a help in a long or complicated task. Each individual step should be listed separately and numbered with intermediate examples. A sample of the finished product should follow the final instruction.

A reference manual is used for just that – reference. It is used when the reader is familiar with the subject and just needs a memory boost.

All publications should be organized for the easiest and quickest access possible. First, a table of contents identifying the major areas and each individual publication within the area. Next, an alphabetical subject index. This can be the most important section of any manual. Imagine any major mail-order catalog without one. Just try to find all cross-references of any item on your own. It is an extremely frustrating experience.

The major area groupings should be separated by tabs. Each area should have its own contents page. Each publication within a major area should have some means other than a relative publication number for quick identification. One idea is to place black bars on the right side of the pages to indicate each sub-publication.

The layout of print on a page is the next important item. In a two-column format, each topic should start at the top of a column. In single-column format, it should start at the top of a page. This sectioning shows the beginning and ending of a topic clearly, with less chance of accidental "run-over."

The next topic is language. Granted, this paper addresses technical publications. By their nature, technical publications require some technical language. However, the bulk of the publication must be in English. It always help to define a technical term, just in case the reader is not as familiar with the subject as the writer. That is the function of the publication after all, isn't it? If many terms are used, a glossary of terms can help those of us who need to see something more than once for it to sink in.

These items are among the first addressed by our advisory committee. The vendor representatives have stated that they have felt these things necessary for a long time, but they had no way to prove their value. Since the users on the committee represent the people paying the bills, their opinion carries importance.

No user will ever be completely satisfied with a given publication, but if that user feels that his suggestions are heard, he may feel there is hope for the future. That may be all that is necessary for him to stay your user and not to decide to shop elsewhere.

Managing The Word War...And Winning

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The campaign to produce data processing documentation is volatile and dynamic no matter where it is waged. Guerrilla wars on the nanosecond battleground of information technology require that a manager rely on unconventional generals. Who are these generals and what are their tactics? Their names are familiar and the strategy they promote - common sense - emphasizes that a manager should concentrate on winning the word war, not on fighting the battles.

From getting along with a managerial peer group to disconnecting a prima donna is covered. All the tactics have been proven as successful, even the non-traditional managerial ones. They will help any documentation army win the war while leaving the other managers and their armies bogged down fighting endless skirmishes.

THEATRE OF ACTION

A large health care organization where all phases of an IBM 3033 multi-CPU environment are documented by a 30 member Systems Administration department for a 300+ member data processing staff.

THE TROOPS

11 Males	20 Exempt	Age span: late 20s to
19 Females	10 Unionized	early 50s

WAR GAME PLANS

The campaign to produce data processing documentation is volatile and dynamic no matter where it is waged. The strongest advance position for your troops to assume is one of active neutrality. To secure this strategic position for the troops, always present your staff, and their work, as a service function. Ignore corporate alliances, they're an illusion at best, and concentrate instead on supplying the documentation your managerial peer group needs. Your peers have their own wars to wage; they recognize good documentation as valuable ammunition in their struggles. Don't waste your mutual managerial energies; wage war on the projects to be documented, not on each other.

THE TACTICS OF GUERRILLA GENERALS

Guerrilla wars on the nanosecond battlefield of information technology require that a manager rely on unconventional generals...General Attitudes, General Time, General Work, General Staff Relations, General Training and General Comments. These guerrilla commanders combine to promote one common strategy: concentrate on winning the war, not on fighting the battles. They know that it is impossible to please everyone all of the time. The strategy that they employ is: learn to settle for less, and try to please everyone most of the time. It's the easiest way to win a war. Concentrate your army on winning the war while other armies remain bogged down fighting skirmishes.

GENERAL ATTITUDES

General attitudes set the tone of a war. A manager has one and only one function: to work FOR the employee. Prove it, don't be afraid to stand up for the staff. But, ensure that the staff understands that support has to be earned, that it will not be given without question.

Expect your staff to treat every problem, no matter how critical, in a calm, logical professional manner. If a manager practices this technique, the troops will follow suit. Hysteria should be reserved for inclusion in scriptwriting projects for cheap melodramas assigned to your department. Advise the staff that they are required to be friendly, professional and firm, especially with each other. Permit no temper tantrums, not even the managerial variety. Never raise your voice to a staff member, because an army respects authority not volume. Emphasize that no one - NO ONE - is ever permitted to raise their voice to you.

For those employees who can't accept this new attitude in the department, or for anyone with a record of personnel problems, view disconnection as an alternative to termination. Disconnection is as simple as phoning a reliable headhunter and touting your problem's strong points. Now face it, any problem employee has some strong points; a good headhunter knows that and will take the issue from there.

A manager should listen as well as talk. Solicit the staff's advice. Listen well, but remember, listening well doesn't mean automatically saying yes.

Help your staff understand the difference. After all, aren't they being paid for their skills and knowledge? Start listening to some of that high-paid advice you've purchased.

Treat every staff member - regardless of title or length of service - with an equal level of professional respect. They deserve it. That action emphasizes that while while individual contributions to the overall effort differ, each person is equally important to the manager. These people, your staff, are the most important factor in your career, so treat them as such. The manager may rank higher on the corporate org chart, but an effective staff is more crucial to a war effort.

During combat the medical corps treats the symptoms of a problem while the commander addresses the causes of a problem. There's no reason for a manager or the staff to confuse the two occupations. Know how to recognize the difference so a problem can be handled promptly.

GENERAL TIME

Time can be the key to victory in a war. Learn to use time efficiently, but no so efficiently that none remains to spend with the troops. A manager's time should be structured so the leader is always accessible to the staff. Any request from the staff for your time should receive the immediate reply, "For you, sure". When the troops participate in the use of your time they'll appreciate its value more, and waste it less. The troops are acutely aware there's a war in progress and they like to have their commander in the trenches so they can ask questions.

When a staff member asks a question, answer it as promptly as possible. People enjoy being told yes, they dislike being told no, and they resent not being answered at all. Additional information or time may be needed before a reply can be delivered, but the questioner deserves to know the reason for the delay.

GENERAL STAFF RELATIONS

Good troops always willingly march in unison when the need arises. Face the manager's reality: a staff spends eight hours a day in close quarters combat. Their battlefield can be bloody or it can be pleasant - the choice is the manager's. Try to ensure a definite personality match in the group; not similar, but complementary personalities. A well-balanced staff is the strongest army that can be fielded by a manager. Don't believe that a strong staff member can carry a weak one. Instead, admit that everyone has weaknesses, so identify them, then concentrate on eliminating those weak areas.

Discourage sexism by all available means, and try to achieve a staff that is equally balanced between the sexes. Any male who can't accept a female as a working equal simply has deep-rooted problems that a mere manager can't begin to cure. It's a moot question whether a female can carry her weight or not, just move out of the way so she can get her work done.

GENERAL WORK

A war can never be won unless all the dirty, tiresome preparations have been considered. Don't save all the dirty work for the newest or lowest paid troops. Everyone, including the manager, should do a few dirty chores, because it's the greatest equalizer around. Prima donnas detest dirty work, so they'll soon go AWOL in search of a troupe that will tolerate their pseudo-stellar performances.

Ensure the staff always keeps you informed. Remind them that the only acceptable surprise comes gift wrapped from a luxury store. An effective tool that prevents surprises is a scheduled staff meeting every two weeks, and don't miss one on the schedule without an apology to the staff. Let them know how enjoyable it is to see all that talent assembled in one room. Spout your spiel at the staff meeting, then shut up; devote 50-75% of the meeting to what the staff has to say, and listen intently to their words. The staff wants to be kept informed, because when people are informed they feel effective and secure. In any war it is a definite advantage to have accurate and complete information; what kind of leader would send troops off to war while denying them the firepower they need to win? If possible, make your staff the best informed unit in your organization. Alert them to the worst consequence if they betray sensitive information - your future inability to keep them informed. Make your staff keep each other informed, too. Encourage everyone to discuss their project schedules, impending deadlines, and other foreseeable problems during the staff meeting. It is not the manager's job to know it all, it is the manager's job to ensure the staff knows it all.

The days of a lengthy employee committment to an organization are gone, and the day of being vested in as many pension plans as possible has arrived. Realize that not every staff member will stay with your organization forever and seek a tradeoff. Tacitly swap concentration on individual professional growth for a job well done, even if it's only for a limited time. Good basic training helps induce a high re-enlistment rate in information technology.

GENERAL TRAINING

It is impossible to win a war without being familiar with what the troops know and how they were trained. Focus on developing specific skills in your staff that other managers ignore. Because words are their business, your staff must read faster than anyone else around. To increase their reading skills, give everyone a comprehensive speed reading course. Don't be foolish enough to believe that everyone your staff meets will be as understanding and enlightened as you. Provide them with skills for handling difficult people. Rely on your staff's inherent organizational skills and you are probably relying on something that isn't there. Develop their project planning skills, because a winning army must know how to anticipate, plan and attack. It is impossible for people to avoid wasting time, so help your staff learn to waste their time more efficiently with time-management training. Teach them to talk non-threateningly to people; they need this skill desperately since they are primarily information gatherers.

And don't neglect their interviewing skills. Let your troops conduct the interviews for any open positions in your department. The manager's role should be to sit in the room and manage the interview. This approach presents several benefits: the applicant receives a definite feel for the environment and its workers because the questions and answers are from the people who perform the job; panel interviews are more open and can be friendlier; since your attention is undivided, you can observe everything (answers, conduct, gestures) in detail. The best benefit: here's that interview training for your staff and it's free.

Encourage external professional contacts by your staff. Sacrifice something else, but protect budget funds for seminars, classes, meetings, professional associations. Information technology moves too fast for any other approach; if a manager can't keep the troops trained they'll soon desert to an army that can.

Always have at least three people capable and trained to be manager. The top performers in any organization always regard the people they've trained and developed as the best monument to their work. A good manager deserves a monument. Rest assured, someone's always honored with a victory monument when a war concludes, so it may as well be you.

Evaluate, evaluate, evaluate. Do it informally three times a year for every staff member, and then more formally annually. They need to know how the manager perceives their performance. Ask them how they think they're doing; require them to submit a written statement of accomplishments well in advance to help establish the basis for the discussions. This also permits criticisms to be delivered in a positive context. Don't dwell on criticizing shortcomings; identify, then educate to eliminate them. Fewer words, and more action from a manager will resolve problems faster than more words and less action will. Praise needs as much emphasis as criticism. Don't be afraid to praise your staff, and do it openly, but only when they deserve the praise.

GENERAL COMMENTS

A winning army does not neglect details; so here's a last few to consider. Practice participatory management. It can work, but only as long as the troops understand that the manager wields an automatic veto. There's a caution light flashing here: don't veto unless there's an alternative to the issue in question and it will be used. Remember, groups do not make decisions, they participate in the process. It is this involvement in the process leading to a decision that is important, not the decision itself. Decision making remains a one-person task in any war. Be aware of that fact and make your staff aware of it, then participatory management becomes a reality.

Know your organization well: how it works, who works it, why it works. Then make it work for the staff and yourself. The structure of any organization has an inherently dual purpose - it can serve people or it can use them. Make it serve your staff, then they in turn can perform more effectively to meet the organization's goals.

Know how to read the handwriting on the wall. Corporate history is full of cases where the handwriting was on the wall when nobody was reading it. Take time to read the graffiti, and while you're at it, scribble a few war slogans commending the performance of your troops.

One final remark: accept the fact that there are always going to be a few mistakes that will simply be impossible to catch. In fact, you might want to start deliberately making a few, just as I have in this paper. Since some people just hunt for mistakes, you don't want to disappoint them - remember, a manager tries to please everyone most of the time.

WHY PEOPLE QUIT: THE SUPERVISOR'S COMMUNICATION BEHAVIOR AND ITS EFFECT ON SUBORDINATES

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Results of a survey of 647 workers indicate that supervisors' communication skills play a significant role in employee retention. Workers are apparently most motivated to quit by supervisors who ignore them or who communicate with partiality. The actual communication techniques which the supervisor uses seem to hold less significance.

PROBLEM

Every year companies spend billions of dollars in the training of personnel. Every year well-trained employees quit their jobs and go to other employers. Widespread job-switching occurs in the United States even in times of high unemployment. Employee turnover is for many employers a serious, and expensive, problem.

People's reasons for switching jobs are manifold: family reasons, money, advancement, etc. We the authors had an hypothesis that supervisor-subordinate communication difficulties might also be among these reasons.

METHOD

To test this hypothesis, we devised a questionnaire. Data were gathered from 647 worker respondents contacted by our students during 1982. The questionnaire had three parts: (1) demographic information, (2) general reasons for the respondent's leaving his or her last employer, and (3) specific elements of supervisor-subordinate communication which might have influenced the job change. The questionnaires were completed anonymously (we barred from the questionnaire any information which would identify any respondent by name).

RESULTS

We now analyze the results of our survey according to the three sections of the questionnaire.

Demographics

The questionnaire solicited a wide range of demographic categories. We do not here go into all the variety of responses, but merely combine and summarize in Table I (further statistical analysis of the entire survey appears in Ramsey, Wright, Cudd, & Parsinia, 1983). The data in Table I, like all other number-crunching for the survey, were generated by the SPSS capability of Southeastern Louisiana University's Honeywell CP6 computer.

General Reasons for Quitting

The questionnaire listed 11 general reasons for quitting and, with each reason, a semantic differential (Likert scale) encompassing the following range of potential responses: "very significant," "significant," "neutral, no opinion, or not applicable," "insignificant," and "very insignificant." Table II lists the percentage of respondents who, for each reason, checked "very significant" or "significant" in the decision to quit the last employer. Table II lists the reasons in descending order from most frequently cited to least frequently; the order of questions on the questionnaire, incidentally, was different from this, and random.

Table I. Demographics of Sample

Place of birth:	Born in Louisiana:	68.2 %	Born elsewhere:	31.8 %
Date of birth:	Born before 1946:	38.8	Born after 1945:	61.2
Gross income, 1981:	Up to $18,000:	58.9	Above $18,000:	41.1
Rural or urban:	Residence in countryside or in town of up to 10,000 population:	52.7	Residence in city of over 10,000 population:	47.3
Job-switching tendency:	One employer in last 10 years:	21.6	More than one employer in last 10 years:	78.4
Sex:	Female:	49.8	Male:	50.2
Union membership:	Union members:	14.8	Nonunion:	85.2
Political orientation:	Carter voters in 1980:	32.4	Reagan voters in 1980:	47.6
Religion:	Protestants:	34.6	Roman Catholics:	42.9
Race:	Nonwhites:	20.0	Whites:	80.0
Marital status:	Married:	61.7	Single, divorced:	38.3
Education:	High school graduates:	94.2	No high school diploma:	5.8

All frequencies have been adjusted to ignore probes left blank by respondents.
The categories for political orientation and religion do not total to 100 %, because there were on the questionnaire for these categories options other than those summarized above--such as "Anderson" voters for political orientation and "Jewish" for religion.

Table II. General Reasons for Quitting

Reason	Percent of respondents citing "very significant" or "significant"
Advancement, or potential for advancement	55.8 %
An offer of more money or better benefits elsewhere	54.5
My interest, or lack of interest, in the kind of work I was doing	34.7
The hours or shift	34.6
Family reasons	30.4
The boss's communication skills or lack of communication skills	29.2
The personalities of the people I worked with	28.9
The facilities	24.6
Desire to move to another geographical area	24.0
Need for a vacation	15.9
Being fired	6.0

Frequencies have been adjusted to ignore probes left blank by respondents.
Space was provided for respondents to write in other reasons. At this point some cited a desire to undertake a course of study. A few recorded a desire to move to a larger or more well-known company. Others cited pregnancy (this would, traditionally, seem to be another family reason).

Communication Skills of Supervisor

The third part of the questionnaire asked the respondent to "take a closer look" at the general reason concerning "The boss's communication skills or lack of communication skills"--that is, to react to possible particular characteristics of the former boss's communication skills. This section of the questionnaire listed 27 statements relative to the former boss's communication skills, and the respondent was to evaluate each statement by marking a semantic differential encompassing the following range of potential responses with regard to the respondent's decision to quit that employer: "strongly influenced me," "influenced me," "no opinion . . . , or it doesn't apply," "did not influence me," and "definitely did not influence me." Table III lists the percentage of respondents who cited each statement in this third section of the questionnaire as "strongly influenced me" or "influenced me." Table III lists the statements in descending order based on frequency of responses, not in the sequence in which the statements appeared in the questionnaire; in the questionnaire the statements were clustered according to whether the particular statement concerned nonverbals, demeanor, diction, or voice quality, with the statement "The boss smelled bad" appearing at the end of the entire sequence.

DISCUSSION

The general reasons for job-switching clearly bear out a common-sense notion that people most often switch jobs to gain advancement or money, more than for other reasons. Nonetheless, the data indicate that what workers perceive as being communication problems ("The boss's communication skills or lack of communication skills") are significant in almost one-third of the situations in which an employee quits (peer communication can apparently also be a problem: 28.9 percent of the sample found the "personalities" in the former workplace to be a very significant or significant reason for leaving).

The data indicate that workers are much more likely to take note of the presence or absence of communication on the part of the supervisor than they are likely to be bothered by the supervisor's use, whether intentional or unintentional, of a particular communicative act or technique (such as gestures or lack of gestures). The most frequently cited problem (35.1 percent) is that the former boss "showed partiality" in his or her communication behavior. Not far behind that is the result of 30.8 percent of the workers who felt ignored ("The boss did not attempt to communicate with me"). These results point strongly to a kind of Hawthorne effect--workers are at their best

Table III. Supervisor's Communication Skills

Possible characteristic of former boss's communication skills	Percent of respondents citing "strongly influenced me" or "influenced me" in decision to quit
The boss showed partiality, communicating with some people more than with others. . . .	35.1 %
The boss did not attempt to communicate with me.	30.8
The boss expressed himself/herself in a tactless manner.	22.5
The boss took forever to get a point across.	20.7
The boss used swear words.	18.8
The boss had problems in using words with the right meanings.	15.3
The boss used bad grammar.	14.6
The tone of the boss's voice was monotonous.	14.0
The boss's facial expressions were improper.	13.7
There were long pauses in the boss's speech.	12.9
The boss talked too loudly.	12.8
The boss had a sloppy handwriting.	12.5
The boss avoided looking at me when he or she spoke.	12.2
The boss had body movements which put me off.	11.6
The boss talked too fast.	11.3
The boss used too many gestures.	11.1
The boss's appearance (clothing, grooming) was a liability.	10.3
The boss was at least partly illiterate in writing.	9.7
The boss looked at me too directly when he or she spoke.	9.2
The boss touched me when he or she spoke.	8.7
The boss smelled bad.	8.5
The boss stood too close to me when he or she talked.	7.0
The boss talked too slowly.	6.9
The boss talked too quietly.	6.8
The boss stood too far away from me when he or she talked.	6.1
The boss spoke with an accent which bothered me.	5.5
The boss used too few gestures.	4.5

Frequencies have been adjusted to ignore probes left blank by respondents.

Space was also provided for the respondent to write in his or her own comment about the former supervisor's communication skills. Several respondents took the opportunity to describe the former boss as a liar. One noted that the former boss "picked his teeth." An occasional respondent was dangerous with spelling: "The boss really hassled me sexauly. He had a mettal problem" (sic).

when they feel that somebody is bestowing attention on them (for more on the original Hawthorne experiments, see Mayo, 1933, and Roethlisberger & Dickson, 1939).

CONCLUSION

A supervisor has no control over some reasons for worker disaffection (family reasons, an individual worker's desire to change geographical location, etc.), but a supervisor *can* do something about his or her communication skills with regard to subordinates. The data from this survey indicate that the number-one communication problem which causes workers to quit occurs when a supervisor fails to communicate with all workers in an evenhanded manner or just fails to *try* to communicate at all. A manager who sits *back* in his or her office pushing paper when he or she ought to be out on the line pressing the flesh is going to have a problem with worker retention. The manager who for no professional reason pays an undue amount of attention to one employee or some employees while ignoring others is going to have even more of a problem. And employee turnover is expensive: it requires paperwork, education of replacements, rebuilding of continuity on the job, etc.

Keep these thoughts in mind when you have returned from this conference to your managerial situation.

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COMMUNICATIONS MANAGEMENT--FORMAL EDUCATION OR ON-THE-JOB TRAINING ?

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The anxieties of new managers, in communications and other fields, can often be ameliorated by an educational program that specifically addresses the management of human resources. One such program is the Master of General Administration program offered by University of Maryland University College. The curriculum is specifically designed to help managers in technological organizations develop their leadership skills and feel comfortable in a management position.

Is the "great man" theory of leadership really dead? Some of us still think that leaders are people born with special leadership traits (Vroom, 1976; Mankin et al., 1980). And when these qualities don't instantly materialize when we are made managers, we feel like failures (Fig. 1) . Suddenly, perfectly competent, capable individuals are not only ineffective in their jobs, but may actually impede productivity in the groups they are supposed to supervise by acting indecisively.

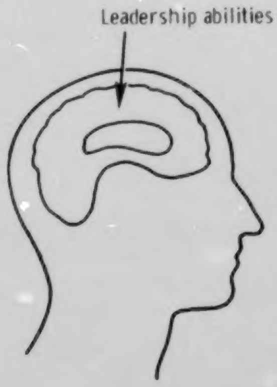
Leadership abilities ?

Figure 1. Are leaders born or made?

Well, if managers are not born with the ability to manage, where do good leaders come from? Many studies have shown that successful management is situational: the effective leader is able to analyze the work situation and respond appropriately (Vroom, 1976; Fiedler, 1977; Hersey and Blanchard, 1977). But, how does the manager know when to be flexible and when to be uncompromising? When and how to encourage subordinates and when to fire them? In communications management, especially, how does the supervisor give writers and editors the creative and intellectual freedom they need and still ensure the quality of the product?

ON-THE-JOB TRAINING?

Of course, a lot of effective managers have learned what they know while on the job. We all know leaders who have come through the ranks, gradually gaining knowledge and experience. But the pace in communications industries today seldom allows the manager the luxury of on-the-job training. Novice managers may have to produce immediately: if the manuals are incomplete or the proposal is late, the manager bears the responsibility and pays the consequences.

CRISIS OF CONFIDENCE

I believe that a large part of the problems new managers may have stems from a lack of confidence in their own administrative abilities. Yet, most technically competent communicators have already shown their capacity for management. Professional communicators must use these skills in almost every aspect of their jobs: they must plan how to do the work; organize the work in the most effective manner; lead others, such as clerical staff, in performing assigned work; and finally, control the quality of the product. In short, they have all the basic management skills; they simply need the confidence and perspective to apply them to supervising a larger group. Moreover, they must understand the additional responsibilities of a manager in motivating and developing subordinates, building teams, promoting relationships with superiors, and following legally acceptable standards in dealing with employees.

MANAGEMENT COURSES

One of the most direct ways of acquiring the necessary knowledge and confidence to be an effective manager is through an educational program that specifically addresses the management of human resources. I emphasize "human resources" because I believe that the proliferating MBA programs presently offered gloss over interpersonal relations. Although the bottom line for any organization is profit, a company's products are only as good as its employees are willing to make them.

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A large variety of programs in human resources management exists. For instance, the latest catalog of the American Management Associations* offers over a dozen short courses in these areas. A number of colleges and universities are also offering advanced degree programs in this field. They go by many different names, e.g., industrial relations, public administration, organizational psychology, but they all emphasize the importance of the individual to the organization.

MASTER OF GENERAL ADMINISTRATION

I am presently enrolled in one such program -- the Master of General Administration program at University of Maryland University College. The curriculum is specifically designed to help managers in technological organizations develop their leadership skills and understand their ethical and moral responsibilities to the organization and society.

The program comprises eight core courses, three electives, and an internship (Table 1). The core courses cover in depth basic management concepts, while the electives provide an opportunity to concentrate in a specific management area, such as information systems. During the internship, the student gains practical experience in planning and directing a management program.

TABLE 1

Core Courses in Master of General Administration Program

- Methods of Organization Evaluation
- The Administrator in a Technological Society
- Planning and Forecasting for Administrators
- Nature of Organizations and Assessing Their Effectiveness
- Organizational Communication
- Performance Appraisal
- Budgeting and Resource Allocation
- Techniques of Leadership

The value of the core courses is the intense and comprehensive perspective they provide on all aspects of management -- even budgeting. For example, "The Administrator in a Technological Society" explores the growth of industry from prehistoric agrarian society to Daniel Bell's postindustrial society (Bell, 1971). Along the way, the course touches on the changes in management attitudes toward workers and the changes in the work force that demand changes in management style. Today's workers are better educated than their nineteenth century counterparts and are no longer satisfied to be working at just any job. The capacity for growth in the job, the availability of company-sponsored courses to upgrade skills, and provisions for leisure time are at least as important to them as job security (Vroom and Deci, 1970). Moreover, the work force of the future is likely to be older and to comprise more women and minorities than at present. The implications of the expanding telecommunications industry must be considered: can some employees, e.g., older people, perform their work at home using computer terminals? How soon will we see a "paperless" office (Fig. 2)? What employee training programs should be planned to accommodate new technological developments? The thrust of this and companion courses is to give the manager insight into the environment in which the organization must operate -- social, technological, environmental, economic, and political.

My exposure to these concepts has made me especially enthusiastic about a proposal to interface our word processing system with our mainframe computer. The change will mean that the editors will be able to receive and manipulate word processing input at desk terminals. No more loose papers floating all over our offices! At another time, however, I might have resisted the change.

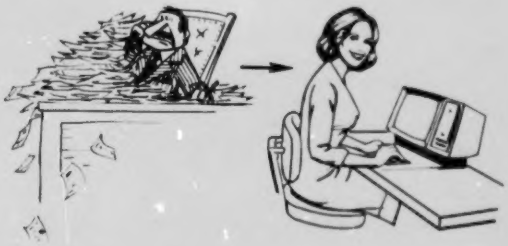

Fig. 2. The "paperless" office is rapidly becoming a reality.

The techniques for designing and conducting evaluations of organizational effectiveness, including statistical tests, are taught in "The Nature of Organizations and Assessing Their Effectiveness." As with assignments in all the courses, a required project here dealt with a real situation. I conducted a study of job satisfaction in two departments at my company for this course -- and found some surprising results. I had hypothesized that job satisfaction would be related to job content, i.e., the types of activities performed on the job. Instead, the study showed that satisfaction was influenced most by recognition and feedback from top management. Our Personnel Manager applied these findings in an evaluation of employee turnover.

One of the most important areas of management responsibility is performance appraisal, and "Performance Appraisal" treats it in detail. Although we may think of performance appraisal as an infrequent or sketchy review of our work by our supervisor, recent court cases challenging employment decisions have imbued performance appraisal with many legal implications. A manager should know the provisions of the equal opportunity laws and how to apply them fairly and impartially to all employees. Inequitable treatment, either real or perceived, could result in legal action against the manager or the company by an employee or prospective employee. Even job interviews and pre-employment tests are considered appraisals within the scope of the law and are subject to the same legal criteria as the actual performance appraisal instrument.

Of course, aside from its legal aspects, the performance appraisal is one of the most powerful tools the manager has for reinforcing those aspects of the subordinate's behavior that are desirable and suppressing those that are not. The appraisal process should be a two-way, candid discussion between manager and subordinate that explores areas of both disagreement and agreement (Table 2). Further, recommendations for employee development, e.g., additional training, new job functions, are a logical outgrowth of an effective performance appraisal.

TABLE 2

Recommended Steps for a Performance Appraisal

Before the appraisal:

- Notify employee of a date and time for the appraisal in advance.
- Ask employee to conduct self-evaluation, including goal-setting, to be discussed at the appraisal.
- Review employee's job description and how well he or she has met the requirements.
- Get input from others in company employee may have worked for.
- Determine areas where improvement is needed.
- Note any career development opportunities.

At the appraisal:

- Schedule sufficient uninterrupted time for the appraisal.
- Ask for subordinate's evaluation.
- Apply "active listening" to stimulate subordinate to speak frankly about his or her concerns on the job.
  - -- Use encouragers such as "Yes," "I see."
  - -- Ask open-ended questions, those that cannot be answered yes or no.
  - -- Paraphrase point raised to indicate understanding.
- Present your evaluation, emphasizing performance on specific jobs.
  - -- Avoid value judgements, critical tone.
  - -- Emphasize benefits of honest information exchange.
  - -- Explore opportunities for career development.
- Make sure each party has a clear understanding of the other's position.
- Set mutually agreed-upon goals.
- Discuss what you, the supervisor, can do to help employee meet goals.

This course made me particularly aware of the role of performance appraisal in helping my subordinates develop and expand their capabilities in line with their interests and the department's needs. As a result, I have recommended courses, associations with professional groups, and other professional activities (including writing a paper for the ITCC) that I feel will enhance their work life and open up other opportunities to them. Of course, there is the possibility they will take their new skills and find a better job, but meanwhile they will be making valuable contributions to the company.

I have also learned that I must keep notes on each subordinate's performance throughout the appraisal period. Otherwise, the performance appraisal, for good or bad, tends to be based only on recent incidents rather than overall performance.

Another important topic, especially for communications managers, is leadership style. What are the various approaches and which should be used with subordinates and superiors in different situations? For instance, writers and editors are likely to resent authoritarian supervision. If experienced, they will be more productive if they are treated as mature individuals who are able and willing to do their jobs. On the other hand, a new employee with very little experience may require detailed instructions and close supervision for a while until he or she has demonstrated the ability to work alone. In other words, the management style is a function of the subordinate and the situation (Hersey and Blanchard, 1977).

Managers should also be aware of their preferred leadership styles (task-oriented or follower-oriented) to make sure that they are not trying to mold the situation to fit the style rather than vice versa. "Techniques of Leadership" includes a battery of psychological tests (Fig. 3) that profile each student by leadership style, interests, and types of personal relationships. The result is greatly increased self-knowledge and increased confidence in one's ability to handle most management situations. For instance, one of these tests characterized me as an experience-based, practical person, who tended to act within prescribed policies. This description made me conscious of the need to be a little more innovative and creative in my management and work style.

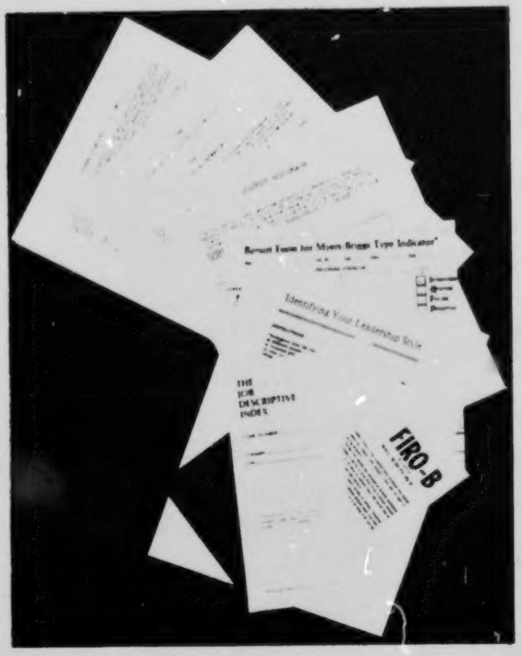
Report Form for Myers-Briggs Type Indicator
Identifying Your Leadership Style
THE JOB DESCRIPTIVE INDEX
FIRO-B

Fig. 3. Examples of psychological tests for determining leadership style.

Additional core courses survey organization communication styles and resource allocation in both the public and private sectors.

WHICH IS BEST?

With my technical background, I have found the social science emphasis of these courses interesting and invaluable in understanding management techniques and their effects. The same school offers a professional certificate for completion of an abbreviated version of this program. I am, of course, prejudiced in favor of the degree program: I feel a shorter program would lack sufficient depth; the advanced degree confers prestige and may warrant a promotion; and -- I have three years invested in the degree program.

However, whatever the type, I strongly recommend some formal management training for all managers. If nothing else, meeting and talking with others who face similar problems provides much-needed support for both experienced and inexperienced managers.

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HOW TO CONVERT HUMANITARIANS INTO TECHNICAL COMMUNICATORS

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ABSTRACT

This paper considers the divergent areas of education and experience from which technical communicators orginally come. Why the technical communicator enters the profession, how he/she starts, what each is looking for, what each finds, how well each will fare, and what keeps each among us are all discussed. Specific recommendations are posed which offer hope for those already in and those yet to join the profession. Reasons to remain in the profession -- and reasons to leave -- are also addressed.

A FAMILIAR START

Frequently, the scenario begins with an imperative question: "Must I have a technical background to be a technical communicator?"

The answer supplied by the experienced communicator is almost as difficult to qualify as the question is to pose for the would-be communicator (i.e., "humanitarian"). And though the answer may be definitive, it never seems to comfort the humanitarian. The hoped-for-but-not-forthcoming response ("No, you don't have to have a technical background") and the reluctant way each humanitarian accepts the qualified answer -- all add up to initial disappointment.

But persistence will out. And the second question: "You mean when you started you didn't really have a technical background?" probes deeper into the first.

VICISSITUDES FOR HUMANITARIANS

Today's "humanitarian" is frequently a rather unique individual: a person with a recent college degree (English, journalism, history, sociology, philosophy, economics, and sometimes, business administration) who discovers on entering the "real world" that joblessness is more prevalent than popular. And who, in turn, suddenly must depart from the prepared script of "making a contribution to society" to "making a living."

This abrupt revelation of what lies beyond classroom and theory has probably turned more former students to fear than any prospect since the military draft. Yet for many -- particularly those who really study the Help Wanteds -- it is also a voyage of discovery. Something called "technical communication" (usually in the form of numerous ads in their local paper for "Technical Writer" or "Technical Editor") begins to attract their attention. "Writer" and "editor" are words they understand. The word "technical". . . well, that's somehow always been passed over.

But not for long.

These humanitarians are basically the same people who love to read novels, discuss philosophical differences, and reflect on the future of world events (albeit abstractly). Their encounters with technology have been, up to now, reserved for outings to Steven Spielberg movies, reading Alvin Toffler predictions, and visits to model homes to see, touch, and all but taste the things they realize they cannot now afford with only a liberal arts degree.

Why do they seek out the technical communication world? Because there are few, if any, jobs open in their own field (those that exist are often low paying), and frequently, and unfortunately, because a malaise has crept into their new reality. . .a growing disinterest, almost a disenchantment, with their original field of choice. And, sometimes, because they also have a friend who is now an editor or writer, or "Documentation Specialist", or "Publications Engineer". . .in a word, "working." And last, but by no means least, because they discern in technical communication a career path leading to brighter, better paying tomorrows.

Encouraged in school (more by personal choice than planned) to assimilate technology in small doses but not really take it seriously, they encounter anew their biggest obstacle: How to integrate essentially liberal arts leanings into what they must now learn -- electronics, computers, programming languages, technical jargon -- to enter this new field. And: how to successfully rub elbows with the engineering students of yesterday who as full-fledged engineers of today now hold the higher paying jobs.

One answer lies in realizing that an "attitude adjustment" is called for, the thinking of the liberal arts major must adjust to accommodate technology. It is here where the real differences cross over respective disciplines: the humanitarian must learn to better understand technology without necessarily becoming an engineer; the engineer must learn to work more closely with the humanitarian who can help him/her to better communicate that technology. As the "humanitarian" merges with the "technologist" and vice versa, the hybrid for each becomes that much stronger. It is here, in the midst of this dichotomy, that the technical communicator begins to prove his/her true worth.

THE BASIC QUESTION. . .

How does the humanitarian gain entrance to the technical world? One way - perhaps the most difficult for the new college graduate -- is to accept a job as proofreader or junior editor for a local company, newspaper, or publisher, or wherever he or she can find an open door marked "communication." Though it is possible to enter as a writer, or fullfledged editor, it is usually more difficult to find these positions. Today some companies do offer these opportunities to newcomers, but such companies are still in the minority.

OTHER WAYS TO BEGIN

If the humanitarian is also a typist, another opportunity offers itself. Humble it may be, but many a writer or editor has had just such a beginning. The opportunity to learn formats, styles, and the language of the discipline (whether engineering, medicine, banking, or any of the other areas open to technical communicators) is the advantage here. The starting point is never the issue, it is the ultimate goal that must be kept in sight. Professional organizations can also help, particularly if the individual becomes actively involved in its affairs. Finding like-minded souls is frequently a problem for the fledgling technical communicator; an organization such as STC offers a ready solution. Recognition can be quickly achieved by volunteering for committee work, associating with projects that entail similar work to that performed on a real job. With time, humanitarians also make excellent chapter officers.

In short -- the humanitarian should accept any related task, whether writing or editing or allied to either, and plunge into it with a fervor. There is a line from Milton which best describes this transition period in the humanitarian's career: "They also serve who only stand and wait."

FIRST STEPS

Wherever the start takes place, one dominant theme should prevail: Always ask questions. The trainee may choose to play dumb (like a fox) if necessary, but he/she must single out that one person among co-workers who seems the savviest, who clearly provides the right answers. Then ask away, soaking up knowledge with that insatiable absorbency only the human brain can exhibit. In the offing, two things normally will occur: flattery (in the form of seeking that person's advice and counsel) will win over any reluctance, and a friendship may develop that can become lifelong. In short: "When in doubt, ask about."

The trainee-in-residence must always look about his/her surroundings. Is there an opportunity for increased responsibility? A task no one else wants to do? If so, the job is to tackle the task with tenacity. Surmount all obstacles using the magic ingredients of resourcefulness, inquiry, persistency, tact, and diplomacy. Many a reputation has been earned on the basis of just such traits.

The eager trainee-in-residence must haunt libraries, bookstores, and the bookcases of fellow communicators. He or she should buy or borrow every book available on technical communication. Then read, absorb, question, prove out the theories or practices contained therein. Continually seek out the "why" behind the "why" of every statement in question. Acquire, through trial and time, a reservoir of acceptable methods to accomplish the tasks set before them daily. If available, each should attend every in-house training course on every facet of technical communication, whether or not currently engaged in it. Each should attend every seminar in the local area that each feels will be of benefit in his/her job as a communicator. That includes oral communications as well.

The astute communicator learns early one fact of life: Even if you have to pay for it yourself, do so unhesitatingly. True knowledge is not limited by pocketbook finances. It is limited only by the horizon imposed by the human mind. The mind's horizon for the humanitarian-turned-technical communicator is unlimited. In brief: Invest in yourself.

When it comes time to advance in the job (each will know when by signs all around: time on their hands; accomplishing the same things in half the time as before; becoming the advice-giver instead of taker; etc., advancement should take one of four forms: greater responsibility; a totally different job; supervision; or teaching other newcomers what the communicator has now learned. At this stage, being paid more money for essentially the same job is not enough.

PITFALLS

Along the way for every humanitarian-turned-communicator, there will be pitfalls. Sometimes, in unexpected, undesirable garb.

Incompetence will constantly rear its head, Peter's Principle seemingly in practice all around. Inefficiency will, on occasion, seem rampant in every facet of the job. Coupled with the seasoned indifference of others, this produces a first reaction --frustration. Replaced by disappointment -- and then doubt, phrased usually in this fashion: "Am I really in the right profession?" (A question that -- ultimately -- each communicator must answer in his/her own way.)

In addition, there will always be those co-workers who prefer the security of a weekly paycheck -- at the expense of any regard for their own future. They are to be studied in depth, but never emulated. Along the way, a familiar two-edged sword will appear to trap the unwary new communicator: (a) Management at a higher level may have little or no knowledge of the technical communicator's job, or concern for it; (b) Management's concern may only be for the bottom line, for whether or not technical documentation pays its own way. Avoiding the initial but inevitable sense of futility this creates is every technical communicator's responsibility. (This is a legendary battle that rages on even when unseen or unheard.)

A RESOLUTION

Out of all this seeming negativism comes a singular discovery for the humanitarian-turned-technical communicator -- personal attitude determines ultimate success or failure in the field. Advancement comes not only from "doing a good job", or "learning the ropes", but from the positive attitude chosen to resolve each new problem as it is encountered. The new technical communicator will only be as successful as he/she chooses to be. This means learning well the basics of writing, editing, graphics, etc; producing usable publications which represent these acquired skills; demonstrating a knowledge of the technical aspects (and the language) of that about which they write; developing a rapport with the engineer/scientist (compounded of psychology, intuition, and cooperation), and not the least, surviving the first year or two wiser and better able to answer the first question: "Must I have a technical background to be a technical communicator?"

At this point it is fair to ask why anyone would want to remain in technical communication. Clearly, it can be a demanding, often frustrating profession. The obvious answer could be "money," a salary above the average. Or. . .a career path, with many directions to pursue, each offering challenges. Or . . .discovery that being "technical enough" is not the ogre it first appeared to be. Or. . .co-workers and the company -- two excellent reasons to continue, especially if there is the closeness some companies maintain. Above all, there is one overriding but overlooked distinction: the constant challenge to the mind, to thinking in creative, constructive, productive terms. And because of this realization, a corollary thought: the truly acute need for the communication skills the humanitarian-turned-technical communicator has to offer.

IMMORTALITY. . .OR PROFESSIONALISM?

The humanitarian frequently arrives at a crossroads marked "Technical Communication" with a hesitancy akin to fear. Fear that is really only ignorance. And ignorance which, given personal persistence, initiative, and an intense desire to learn, soon turns to knowledge. Desire, more than any other single factor, determines how successful the humanitarian will be once he/she steps into the technological world.

Employers do hire technical communicators from the ranks of the non-technical. Every day. And non-technical people can -- and do -- succeed admirably in the world of more technically-oriented people. They do so by investing their time, effort, and a belief in themselves that enables them to prosper in their new environment. In essence, each successful humanitarian-turned-technical communicator recognizes the truth of Omar Khayyam's words

> "The moving finger writes; and
>   having writ,
> Moves on: nor all your Piety
>   nor Wit
> Shall lure it back to cancel
>   half a line,
> Nor all thy Tears wash out a word
>   of it."

An apt summation, to which a more modern day paraphrase may aid the humanitarian-in-transition:

WHAT YOU WRITE. . .

. . .LIVES ON; all your fears
cannot erase one word of it,
    nor all your hopes for deathless prose
    convert a miss into a hit.

But, having writ, you must move on
    to tasks unborn as yet.
Bylines and innocence, ego and pride
    (ah, no longer the blushing bride),
    these you must forget.

Write on, the user waits amidst
    his need to know
And you, who hold the key, must
    tell and show, the way --
Rebuild, in words, what others
    try to say.

For you, the task is not to shirk
    but to produce, to work
The wonders with words,
    to edit tighter and tighter,
The words that make of you,
    technically, a writer.

PROCEDURE WRITING: A TOOL FOR MANAGING

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PROCEDURE WRITING: A TOOL FOR MANAGING

When a company hires hundreds or thousands of professionals to undertake some fixed purpose, the company - no matter what its goals - establishes procedures. The company then proceeds or operates in accordance to these procedures. Simple enough, I suppose; but "How is it done?" and "Who is to do it?"

In a business organization, procedure writers need to write about each activity which must be conducted to achieve the company's goals. This seems to be a simple task, but the writer (unless the person is an upper manager) will have to depend upon the company's management staff for direction. This is true because there are often different ways to reach particular goals, and the upper managers decide which paths to take.

Directing a company through published standards for operation (procedures) requires cooperation between an operations manager and a technical communicator. The manager, as decision-maker, supplies the writer with information. The writer, as director of procedural publications, provides grist for the writing mill. Office Services, i.e., word processor operators, graphic illustrators and reprographics personnel, produce the procedures according to the company's and the writer's style and format guidelines. The end product (Procedure Manuals) should reflect in a consistent and practical manner the company's standards for operating.

Once procedures are established, they must be implemented. Even though the operations manager signs and becomes responsible for each procedure, this person rarely trains individuals affected by these procedures, nor does the operations manager serve as diplomat on behalf of the procedures. Instead, the technical communicator assists the employees who must use the forms or follow the procedures; the communicator argues for the methods of operating and hears, on management's behalf, the compaints of detractors and recommendations from improvisers. The technical communmicator acts as a mouthpiece and sounding board. The writer becomes management's representative. This brief explanation shows how the publication of procedures also provides management with a tool for managing.

It should be emphasized that there are rules and those who make them, and there are writers or those who transmit the rules. The writers do not decide what is best for the company, although their advice and recommendations are a natural part of procedural development. Rule-makers are apt to be experienced managers or even vice presidents who have grown with the company and learned the effect of procedures, as well as their necessity. The writers need to recognize their working environment, the acceptable language and appropriate terminology. Trained writers, able to analyze the primary audience and generate the messages accordingly, make the best procedure writers. It is helpful if the procedure writer has experience in public relations or human resources management because the writer often must persuade others by convincing them that the rules are best for all.

Let us consider more specifically the situations wherein procedures are necessary. Procedural publications govern employees in at least two different situations:

- A new company
- A changing company

Procedures for a New Company

In any new company of considerable size, the technical writer assigned to direct the publication of a procedure manual must first of all list the necessary activities which will accomplish the desired goals. Once a complete "kick-off" list has been established, the writer also has developed a preliminary index. This list of activities or tasks will need to be broken down into groups of sub-tasks before the kick-off list can be used effectively as an index. When the list has been considered and agreed upon by the manager and the communicator, the index is published for review by other managers; simultaneously, it provides the procedure writer with a checklist of the necessary write-ups for the procedure manual. In summary, the first task when developing a procedure manual is:

Step One: Generate Index and Issue for Review.

Before writing the standards for operation the writer must lean on the operations manager for advice regarding policy and priorities. Since the decision-makers are the vice-presidents, president and board members, the operations manager works in concert with the guidelines established by this upper echelon. He relates the directives which govern operations and also ranks the procedures in order of importance so that the writer knows not only what to say, but also what is most important. Thus the second step is summarized as follows:

Step Two: Learn Policies and Priorities

During an assignment as a procedure writer for a corporation, I received a directive from operations management to publish two procedures within 30 days. The engineering company within this engineering, construction, manufacturing and natural resources corporation had just lost a lot of money on one of its major contracts. Management determined that future problems would be reduced, or even eliminated, if some key procedures could be improved. The goals of operations management were:

- More effectively monitor material quantities received in the field for the construction of industrial plants.
- Improve the record-keeping of changes to subcontractors' original orders during the execution of their field tasks.

The words from the vice president were: "I want consistent and accurate material summary reports maintained by the engineers." The other directive was, "All Change Orders are to be adequately documented and placed on file by the Project Manager."

In response to these orders which established policies and their priority, two procedures were written, reviewed and published. They were entitled: Material Summary Reports and Change Orders for Subcontractors. Each of these procedures required new forms and practices: the procedure for monitoring materials for construction included the use of material take-off sheets and material summary sheets; the procedure governing Change Orders incorporated project scope-change notifications and change - order requests.

The experience detailed in the preceeding three paragraphs described a necessary reaction to "Policy and Priority" (Step Two), now we shall go on to the next step.

Even though writing the procedures for each of the topics listed in the index is usually the most difficult and time-consuming effort, sometimes establishing the "look of the book" in an acceptable format requires more determination and idea generation than drafting the procedures themselves.

Each draft of a procedure goes through a review-and-revise stage. In this stage, drafts are first reviewed by the operations manager before being sent to the managers of those employees affected by the standards for operation. During this period, reviewers analyze the proposed procedure(s) and relay their comments to the procedure writer. The writer receives the managers' comments and, in concert with the operations manager, revises the subject procedures. This practice ensures that the standards for operating or conducting business are agreed upon by all parties who will be using these procedures.

Once a procedure, group of procedures or book of procedures has been drafted, and then issued preliminarily for review and later revised to incorporate comments, it can then be formally issued for practice. Although some companies and their operations managers prefer to issue "standards" unilaterally without reviews and considerations, my experiences - having worked in both situations - prove that the method of drafts, "prelims," and then formal issues works more smoothly and requires less work in the long run. For when one individual or even a committee of experienced people try to establish procedures without allowing a review by those who will use them, procedures are issued and then inevitably revised and reissued in a formal fashion anyway. This inefficiency proves to be more costly in dollars for production and employee man-hours.

While we are on the subject of time consumption, as an anxious writer responsible for the publication of a procedures manual, I once suffered through a six-month period wherein the "look of the book" was batted back and forth by a group of corporate officers who could not agree upon the procedure for developing procedures. Fortunately, the operations manager governing my efforts in this particular case, knowing that committees are inefficient and that the future belongs to the efficient, reacted forcibly.

His words to me were these, "I am not going to wait with these procedures while they [a group of corporate...] argue about the color of paper, size of the binder and design for the cover of this procedure manual. Publish these things [procedures] and when they work it out we will reissue them. It is more important that the employees know how to conduct business."

Therefore, I complied with the manager's request and completed what can be referred to as:

Step Three: Write the Book and Establish Its Look

Now, in an attempt to summarize and emphasize the three-step approach to writing procedures, the necessary developments are:

1) Generate Index and Issue for Review
2) Learn Policies and Priorities
3) Write the Book and Establish Its Look

Procedures for a Changing Company

This same job of procedure writing, when conducted in a slightly different situation - a changing company, requires another approach. The technical communicator becomes more of a coordinator, peacemaker and advisor.

Companies constantly change and as they do their methods of operation alter as well. Some firms hire outsiders as consultants to advise management in terms of efficiency in operation. Others depend on their own upper management to dictate methods, even though persons at this level are detached from the daily routines and are sometimes unable to determine what is best for the troops. Still another alternative for companies caught in change is the association being made between operations managers and technical communicators. The technical writer holds three advantages over outside consultants and upper management when it comes to establishing the methods for operating efficiently.

1) Technical writers cover a lot of ground, keeping in touch with almost all facets of the corporation or company. Furthermore, the technical writer retains a sense of objectivity because of the necessary broad base of interface.

2) Technical writers develop a keen sense of communicating and realize what it takes not only to send a message out also to persuade the receivers that the "new way" is best for all.

3) Technical writers are in the ditch digging along with the other workers. Communicators are not promoted to a level where they become detached, unknowing and insensitive to the worker's way and means; instead, communicators are an integral part of the work force.

Now, with these premises in mind let us explore the corporate environment and expose some of the daily routines and new scenes in an engineering and construction company that has had to change its methods of operating in order to survive and be profitable.

In 1981, the national prosperity screeched to a halt and many companies lost money. As economic conditions tightened their grip on business prospects and capital investments, tough decisions were called for. One company that I know of decided to combine the operations of three divisions and develop a company whose members provided the same services, i.e. design, engineering and project management for industrial plants. But, at the same time, this newly founded company provided a wider variety of products.

What did this reorganization precipitate? First, it changed the operational policies; second, it altered the organizational structure and chain of command; third, it required a reduction of staff.

Operational policies had to change because each of the different ex-divisions had their own traditional way of being. But the crux of the matter was that past practices had to be consolidated into the most efficient and effective methods for a new company.

Each department's manager in the new company assigned a technical writer to generate the necessary procedures. It is important to realize that within each of these new departments there was a combination of employees from different backgrounds, i.e., different divisions. Each person had a tendency to be loyal to his or her "old way" of being. A certain inertia had to be overcome. Thus, the technical writer's role became that of a coordinator.

Just as in the previously described, three-step approach for developing procedures, the first job involved generating a combined index which incorporated all sets of procedures of the former divisions.

Secondly, the operations manager considered the similar-but-slightly-different approaches, decided on the most appropriate practice (policy), and initially drafted or expressed the procedure to the technical writer. To guard against issuing procedures which might cause disunity or uncoordinated practices, proceedings were established whereby each of the departments was required to transmit proposed new procedures to representatives of other departments for review and comment. It then became the writer's job to present the new ways to the other affected departments. Upon receipt of the other departments' appraisals of certain procedures, the technical writer, along with the operations manager, consolidated the various comments into the new procedure.

Finally, there was step three: formally issuing the procedure(s) to departmental personnel for use. But there was as much coordinating, training and diplomacy involved with establishing procedures for a changing organization as there was in writing, editing and publishing. So, the technical writer, at this point, becomes an advisor or training administrator during the implementation of new or revised procedures. During a time of extreme change for a company - as in a merger - the communicator's job involves training and administrating more than writing, since the normal course for a merger requires discarding the procedures of the company that has been bought out and implementing the existing procedures of the parent firm.

Throughout this discussion, I have relayed the three-step approach for developing procedures, not only for new companies but also for changing companies. At the same time, I have tried to focus on the natural relationship between operations managers and technical communicators during this process of generating procedures. The bottom line: procedures and those who write and implement them are an effective tool for conducting business.

MEETINGS-MEETINGS--MEETINGS

(Cost Effective or Cost Defeating?)

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In this decade of high inflation, high unemployment, high interest rates, unfavorable balance of foreign trade, reduced factory loadings, etc., there exists a hidden negative contribution to profits of the entreprenuer. This factor is caused by apparently unnoticed low productive, inefficiently run, repetitious, and often unnecessary meetings.

The annual cost of meetings including transportation and incidentals in the U.S. is estimated to run into billions of dollars. However, meetings are necessary (ideas developed and exchanged, decisions made, vital information exchanged, etc.). The problem lies in the abuse, poor planning, and a lack of checking the cost-to-effectivity ratio (CER) figure for a meeting. A proven method of cost analyzing meetings is discussed with warning flag indicators, and other solutions to this on-going meeting problem.

Human resource behavioral responses represent complex variables that do not necessarily obey mathematical processes. Complicating this procedure is the fact that each additional person at a meeting usually represents a different set of complex variables. Thus limiting the number of meeting attendees where a realistic decision or goal is required will enhance a solution by limiting the number who can divulge high information levels in short periods without high distortion levels.

The author is perturbed over why ineffective, expensive, and inefficient meetings continue. This workshop demonstrates the results of complacency, with synergistic methods to improve the cost and effectivity of Meetings- Meetings--Meetings.

INTRODUCTION

In this decade of high inflation, high unemployment, high interest rates, high energy costs, unfavorable balances of foreign trade, reduced factory loadings, etc., there exists a hidden negative contribution to profits of the entrepreneur. A significant factor in this problem is the apparently unnoticed low productive, inefficiently run, repetitious and, often unnecessary attendees at these meetings.

A calculation of 11,000,000 meetings take place in the United States daily (1). The annual cost of meetings including transportation and incidentals in the U.S. is estimated to run into billions of dollars (2). However, meetings are necessary (ideas developed and exchanged, decisions made, vital information exchanged, etc). The problem lies in the abuse, poor planning, and lack of checking the cost-to-effectivity ratio (CER) figure for a meeting. A proven method of cost analyzing meetings is discussed with warning flag indicators, and other solutions to this on-going meeting problem.

The leader of a meeting is a manager for the meeting duration whether the formal title is held or not. This is because the leader should exhibit a management function by setting meeting goals, assigning personnel, *determining meeting costs*, guiding the participants toward these established goals, keeping communication paths open, resolving problems quickly, allocating discussion times and duration, leading the way to effective decisions, which cumulatively should produce a cost-effective problem solution through synergistics.

Management style relating to managing meetings is a completely different management technique than managing inanimate operations. Human resource behavioral responses represent complex variables that do not necessarily obey mathematical processes. Complicating this procedure is the fact that each additional person at a meeting usually represents a different set of complex vartiables. Thus, limiting the number of meeting attendees where a realistic decision or goal is required will enhance a solution by limiting the number who can divulge high information levels in short periods without high distortion levels or distractions.

The cost-defeating, time-wasting meeting syndromes will be pointed out, analyzed, and real-world solutions given. The author is perturbed over why ineffective, expensive, and inefficient meetings continue through the years. This workshop demonstrates the results of complacency, using synergistic methods to improve the cost and effectivity of Meetings-Meetings--Meetings.

DETERMINE AUDIENCE REACTION TO WORK BUSINESS MEETINGS

A survey is taken of the workshop audience to determine degree-of-satisfaction with their work-site meetings. This two-way discussion is tabulated to cite the meeting problems reported, compare the statistics with published data, and work out the problems encountered. The idea at this point is to "loosen up" the audience and get them to vent their meeting-related dissatisfactions. Problems must be clearly identified and understood before solutions can be applied. Continued audience participation, effectively monitored, must be maintained and directed along established paths to give them solutions to low productive, wasteful, boring, and expensive meetings.

WORK MEETING DEFINITION

The purpose of a work meeting is to inform and/or be informed by transferring information in the most cost-efficient and time-effective manner consistent with the meeting nature.

FUNDAMENTAL CONCEPTS

In World War II the United States developed a national slogan-- "IS THIS TRIP NECESSARY?" Obviously its purpose was to save critical fuel, rubber tires, etc. Today this author challenges you to adopt a new slogan-- "IS THIS MEETING NECESSARY?" Time is vitally important to key personnel. Their time must not be wasted in needless, endless, routine, boring, or inefficient meetings.* Meetings in the 1980s are very costly, and increasing (3,4). This is directly related to the personnel number attending, their mean hourly salary, mileage traveled (with associated expenses) and loss of productivity while away from desks. Quickly, prior-cost a meeting to be sure it's justified. At least two things can be said about meetings, they are necessary evils, and are expensive (3,4). Table 1 cites typical, hourly meeting costs related to number of participants.

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* From the film "Meetings, Meetings, Always those Bloody Meetings," J. Cleese.

TABLE 1. PERSONNEL COST PER HOUR

(Multiplication Factor of 2.3 Assumed for Overhead and Fringe Benefits)

AVERAGE ANNUAL BASE SALARY*	NO. ATTENDING MEETING							
	4	5	6	7	8	9	10	...N
$50,000	$221	$276	$332	$387	$442	$498	$553	...N$
$40,000	$177	$221	$265	$310	$354	$398	$442	...N$
$30,000	$133	$166	$199	$232	$265	$299	$332	...N$
$20,000	$ 88	$111	$133	$455	$177	$199	$221	...N$
$15,000	$ 66	$ 83	$100	$116	$133	$150	$166	...N$

*Based on a 2,080 hour year

An interesting phenomena occurs when the reader uses this table to estimate meeting costs as attendees increase, and the number of meetings of the organization are viewed on an annual basis with travel costs also added. The expense becomes astronomical. If the meeting benefits outweigh the costs, then the meeting is justified. Consider that meetings exceeding two hours duration introduces the Law of Diminishing Returns.

MEETING QUALITY

The quality of most meetings range from poor to horrid (5). This fact must be realized before we proceed further, and that most meetings can be made much better. Thus, there is an undeniable fact: Meetings need to be and can be improved upon. How can they? See Table 2.

TABLE 2. MEETING DISTRACTORS

When attending meetings are you:

• In a distracting location	Why?
• Bored	Why?
• Restless	Why?
• Drowsy	Why?
• With too many people	Why?
• Lost in monotony	Why?
• Involved in side issues	Why?
• Unproductive	Why?
• Laughing at "cheap shot making"	Why?
• Faced with endless acronyms	Why?
• Using "positive talk"	Why Not?

If the "Why?" questions have been answered, heavy emphasis has been placed on your need for better meetings. Again, if you have any responsibility for calling meetings or conducting meetings, then you are responsible for the economics or productivity of the meeting or the meeting results.

The fact that a supervisor or manager may be the best in your business does not necessarily mean that their conducted meetings are good, or to be used as meeting model (5). Do not conduct or control meetings too tightly. Steer or orchestrate the meeting. Encourage dialogue. The free outflow of information and two-way communication must be maintained if problems are to be solved or goals attained. At the same time one must be alert to work around the detractors, or spot the signs of boredom. Table 3 lists some helpful observations.

TABLE 3. LIMITATIONS TO SUCCESSFUL MEETINGS

1. More meetings and longer meetings lead to poorer meetings.
2. The ability to reach key decisions is inversely proportional as the number of participants increase.
3. Body language is a strong meeting indicator. Learn it well and watch for it.
4. Watch for "Gamesmanship". This is a form of mind study (and most unprofessional) where Transactional Analysis (TA) is employed (slip the "fast shuffle" or "put the needle" to a competing associate, or deliberately fail to side with or assist someone in difficulty at a meeting (assuming the person is not wrong). This is a psychological meeting-war game that can destroy the meeting's success.

HOW TO APPLY EFFECTIVITY TO MEETINGS

Organizations should try to impress upon their supervisory and key individual staffs that conducting a successful meeting is a management skill as highly prized as any other trained management skill (3). Meetings must not be allowed to fall into a strict habit. This should occur only if the meetings are critical to the dissemination of information to aid management decision making, business changes and their implementation (4).

Follow the procedures listed below:

1. Determine that meeting is absolutely necessary.
2. Prepare an agenda with specific goals and submit agenda to attendees prior to meeting.
3. Invite only those absolutely needed.
4. Keep to a set time schedule and meeting length.
5. Avoid inviting those who tend to disrupt meetings.
6. Take meeting minutes.
7. Control those who tend to dominate or sidetrack discussions.
8. Stick to the agenda.
9. Summarize the meeting.
10. Issue meeting goals, minutes and summary to participants as soon as possible.

KEYS TO LIVEN MEETINGS

All meetings should have substance and "life" as shown below (2):

- Open meeting with an attention getter.
- Stir up interest and hold that interest.
- Create desire.
- Inspire confidence.
- Induce action.

PLAN FOR COST/TIME EFFECTIVE MEETINGS

A cost and time effective meeting occurs when all necessary-only attendees solve or at least agree on problem solving paths in a minimum time period. Strive for smaller meetings, bigness tends to be unwieldy and expensive. This leads to difficulty achieving objectives due to deviations. Control and redirect the efforts of "run-on" artists, pompous dominants, and intergroup rivalries. Choose meeting participants based on their specific need for the information or their ability to contribute. Although not invited specifically for the meeting there is nothing wrong with bringing someone(s) in the role of technical expert(s), counselors, consultants, or those who lend credence to specialized information.

This writer emphasizes the work of Dunsing (5) that such formal meeting conduct procedures such as Robert's Rules of Order, or other social parliamentarian rules and procedures are out-of-place in a business-oriented meeting. The formality and overly restrictive procedural conduct of these meeting types interrupt the meeting pace. This, therefore limits productivity in resolving fast-paced business problems.

In the scramble to turn a recessionary economy into one of sustained growth, productivity increases are mandatory. Time is a precious commodity for everyone. If a meeting might possibly be unnecessary at this time point, or some key data is incomplete, or a key individual cannot be there, cancel the meeting and do something better. The meeting can be held later. Send a memo instead to your distribution. Why not have a quick "ad hoc" meeting or subcommittee informal session instead? Entirely too much emphasis is placed on regularly scheduled meetings simply because the schedule calls for a meeting. This is significant if meetings are charged to a firm's overhead account.

TOO MANY MEETINGS FLAG ORGANIZATIONAL PROBLEMS

There are a number of common symptoms signaling organizational problems. One outstanding symptom is that too many firms require excessive meetings (6).

It is a mistake to structure a job function so that it requires continuous meetings. This becomes especially critical when considerable time is spent traveling. One cannot work and travel at the same time. One cannot meet and perform productive work at the same time. Person-to-person meetings with associates, subordinates, superiors, and customers are absolutely essential (6). This situation can be improved by better selection of key personnel, meeting locations and frequencies to substantially reduce the lengthy time loss traveling with the attendant expenses. However, it is the holding down of this activity to an absolute must, or shifting the meeting costs to a special meeting account, or at least applying the rule "IS THIS MEETING NECESSARY?" that reduces the negative impact on profits and organizational problems.

COST-TO-EFFECTIVITY RATIO (CER)

The author has devised an interesting simple formula for determining the relative merit of a meeting. The merits of this formula are predicated on the user having attended previous similar meetings. This helps the formula user to establish a base of reference to use as a guide to predict the value (CER) of a planned meeting where the number of attendees are known. The elapsed time between meetings is not a significant factor. The quality or effectivity is. If the true costs of traveling by all participants are known (i.e., local auto mileage costs, T & L (travel and living) for out-of-town participants, our accuracy increases . However this is not difficult to estimate quickly. Also we estimate the hourly salaries of the participants. The number attending is known. The interesting part of the equation is that the cost terms are not required to be accurate to the nearest dollar, only a realistic dollar collective estimate is needed. The Q-rating of the meeting is the unbiased fair-rating that you place on the worth or value of the meeting to you -- the attendee. This figure should be in a range of 1-9 . The figure 0 is not used for two reasons: (1) It is hard to imagine that a meeting is absolutely worthless -- something (although small) must have been learned. (2) If zero is used in the denominator, the equation would yield infinity, which of course would lead to a highly improbable condition. Conversely 10 is not normally used since very few meetings could be classified as absolutely perfect.

Assume eight are attending a meeting including you for one hour. Two have a $40,000 salary range, 4 have a $30,000 salary range and 2 have a $20,000 salary range. With reference to Table I the personnel cost per hour is as follows:

Let: $$\Delta n_1 \quad (S_{ah}) = \$111 \qquad (1)$$

$$\Delta n_2 \ (S_{ah}) = \$133 \qquad (2)$$

$$\Delta n_3 \ (S_{ah}) = \$44 \qquad (3)$$

$$C\ (\$) = \Delta n_1(S_{ah}) + \Delta n_2(S_{ah}) + \Delta n_3(S_{ah}) \qquad (4)$$

$$= 111 + 133 + 44 \qquad (5)$$

$$= 288 \qquad (6)$$

where: Δn_1, Δn_2, Δn_3 = No. of attendees in given salary increment

S_{ah} = Salary (plus expenses if known) increment for Δn_1

C = Total dollar cost per hour for the variables in Equations (1), (2), and (3).

NOTES:

1. Multiply C by the no. of hours meeting lasts. If figures are realistic, factor into C all T&L, local mileage, and time participants absent from work station.
2. A simplified approach can be used to expedite the solution by eliminating T&L costs. The result can be used as an approximation.

The meeting CER is simplified to

$$\mathrm{CER} = \frac{C}{Q} = \frac{288}{5} = 57.6 \qquad (7)$$

where C and Q are ibid.

Figure 1 emphasizes the effect of improved meeting quality Q on lowering the CER, as shown in Equation (7). The reader is welcomed to use several sets of data for C and E values from actual meetings, and plot the data. Again this supports the importance of keeping the CER figure as low as possible through more attention to meeting quality and lowering numbers of meeting attendees.

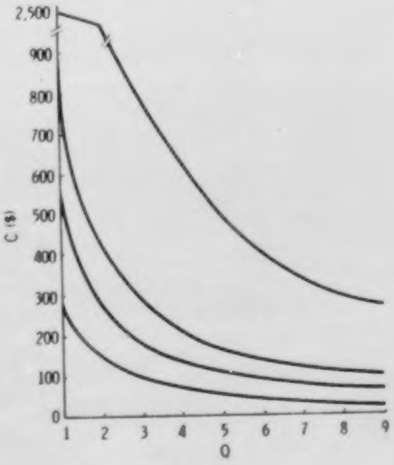

Figure 1. Sample CER Relationships (W.R.T. per hour base)

HOW TO PRODUCE SUCCESSFUL MEETINGS

The Y-theory developed by Douglas McGregor states that all people have the potential to think creatively, to be challenged by their work, and to invest themselves in the job (7). The meeting initiator or planner should demonstrate all of the above in preparing a meeting.

Perform the following:

1. Establish the Meeting Need (Is this meeting necessary?)
2. List clear-cut meeting goals.
3. Make an Agenda. (Avoid nonessentials)
4. Select meeting goers carefully for those who must be at meeting -- minimum no. possible.
5. Determine the shortest meeting length time possible and stick to it.
6. Find the most convenient location to all concerned with best meeting environment.
7. Send the meeting notice to distribution early enough to give participants time to prepare.
8. START ON TIME.
9. Stick to Agenda.
10. Keep detractors from deviating the discussion.
11. Keep "Breaks" short and re-start ON TIME.
12. Use handouts if information presented is very detailed.
13. The meeting leader must maintain control but be a guide to steer the meeting through the meeting goals. Must not be a "Top Sergeant".
14. Minutes must be taken with names of all attendees and absentees and include total time involved.
15. Send out meeting minutes with a summary of goals and plans, details, location, etc. of new meeting (if required) (1).

MOST EFFECTIVE MEETING TIMES

The most effective meeting times are listed in sequence of best productivity:

1. Started and completed during business hours.
2. Starting on-time at 1-2 PM.
3. Luncheon meetings.
4. Before morning work start hours.
5. After work meetings.

Some explanations are in order. Step 2 meetings can lead to drowsiness due to people having lunch and then sitting back and relaxing. This meeting must be kept lively. Luncheon meetings are marginal in effectiveness since the tenseness of the meeting while eating leads to stomach disorders or aggravating existing disorders. Also, the eating activity requires divided attention to program. Meetings conducted before normal work start-time increases anxieties due to energy conservation share-the-ride problems and distances traveled. The least effective meeting time is after work sessions. Most participants will not be at peak efficiency after a difficult or full work day. More anxieties than Step 4 occurs due to preplanned family commitments.

SYNERGISTICS

Synergistics is the effect achieved when the cumulative result of an activity exceeds the normal sum of the individual efforts. This is especially effective and should be strived for in well-planned and conducted meetings. When all participants are well prepared, concise, on-time, stayed on track, goals met with problems resolved, and meeting ending on schedule or earlier, the meeting is highly successful.

CONCLUSIONS

Again, the purpose of a meeting is to inform or be informed by transferring information in the most efficient and time-effective manner consistent with the meeting nature. It is beyond the scope of this workshop to solve every problem related to low productive meetings. We have investigated the critical areas that adversely affect our costs, time, and effectivity of meetings. Adherence to the methods presented should stimulate the user to be ever-alert to correcting the past bad practices. Further, it should lead you to pursue additional methods from the work presented here. Douglas McGregor's Theory Y (7) is directly applied here. Do not schedule or conduct unproductive meetings. Cancel or terminate them to save time, expenses, and bored attendees. Keep meetings as small and short as possible. Apply the CER principle. Avoid using the jargon and acronyms associated with that narrow type of project unless all participants are from that group.

I am challenging every participant who is troubled with the Profit and Loss columns on a Balance Sheet to take a hard and continuous look into improving productivity, and decreasing overhead and job costs by improving all of those Meetings - Meetings -- Meetings. Perhaps then, the author will no longer be perturbed over why ineffective, expensive, and inefficient meetings continue through the years.

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WORKSHOP
RECRUITING AND HIRING TECHNICAL WRITERS AND EDITORS

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Recruiting and hiring technical writers and editors is a process that can be described as non-scientific, subjective, and intuitive. General information on the recruiting and hiring of personnel is available in the literature, but it deals primarily with decorum, routine, psychology, and legal aspects. We need to add another dimension; we need to explore the special circumstances, criteria, and judgments that affect the recruiting and hiring of knowledge workers.

In this workshop we will examine the process from the manager's viewpoint. We will concentrate on five discrete segments:

1. Job definition and description
2. Recruiting sources and aids
3. Interview techniques
4. The selection process
5. Lessons learned from successful and unsuccessful hiring decisions

Our discussion leaders will present an overview of each segment, challenging the audience to offer comments, ask questions, and supply answers. Our objective will be to analyze the important aspects of the recruiting and hiring process with emphasis on learning from each other. In cooperation with the audience, we hope to devise a checklist of DOs and DON'Ts that will help us to make good hiring decisions.

John L. Simons of Kling Lindquist, Philadelphia, will talk on job definition and description. Curtis H. Gates of The Mitre Corporation will deal with the topic of recruiting sources and aids. James M. Lufkin of Honeywell will illustrate pitfalls to be avoided in interviewing by means of a new skit he has written for this workshop. Al O'Banion of Deere & Co. will cover important aspects of the selection process, and I will lead a discussion on what we can learn from successful and unsuccessful recruiting and hiring experiences.

CHANGE MANAGEMENT: CONTROLLING AND COMMUNICATING CHANGES TO THE PRODUCTION DATA PROCESSING ENVIRONMENT

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Change management is an organized approach to the review, approval, implementation, monitoring, and communication of all changes to the production data processing environment. Change management has as its two primary objectives minimizing the impact of changes and maximizing productivity. The change request is the tool used in the change management procedure to control and communicate the change to users, programmers and management alike. While change management procedures may vary from company to company, the concepts of change control and communication are universal. In today's dynamic data processing environments, where changes to production computer systems are everyday and often every night occurances, managing changes is as important as actually implementing them.

INTRODUCTION

In today's complex and dynamic data processing environments, changes to production computer systems are everyday (and often every night) occurances. Managing changes effectively, i.e., controlling and communicating them, is as important as actually implementing them. Changes are often made to production programs, for example, and no one is aware of the changes except the programmer who made them. Sometimes the programmer will rationalize this situation by arguing that the changes are transparent to the user. But the result of changes will always be felt somewhere, no matter how small or insignificant the programmer thinks the changes are. Programmers occasionally fail to recognize the impact of changes they have introduced to a system in the production environment. For this reason, all changes must be tightly controlled and communicated to those who need to know.

DEFINITION OF CHANGE MANAGEMENT

Change management is an organized approach to the review, approval, implementation, monitoring and communication of all changes to the production system environment. The two primary objectives of change management are: 1) minimizing the impact of changes and 2) maximizing productivity.

DEFINITION OF A CHANGE

A change represents a modification, transformation and/or replacement of some aspect of the production system environment. A change, in this context, affects either the hardware environment, the software environment, or both. A change in the production system environment may be created not only by a change in the maintenance activity, but also by introducing new applications or new equipment into the system.

CATEGORIES OF CHANGE

Typically, changes fall into several different categories depending upon their size, scope, and the urgency associated with their implementation. For purposes of illustration, changes can be divided into the following categories:

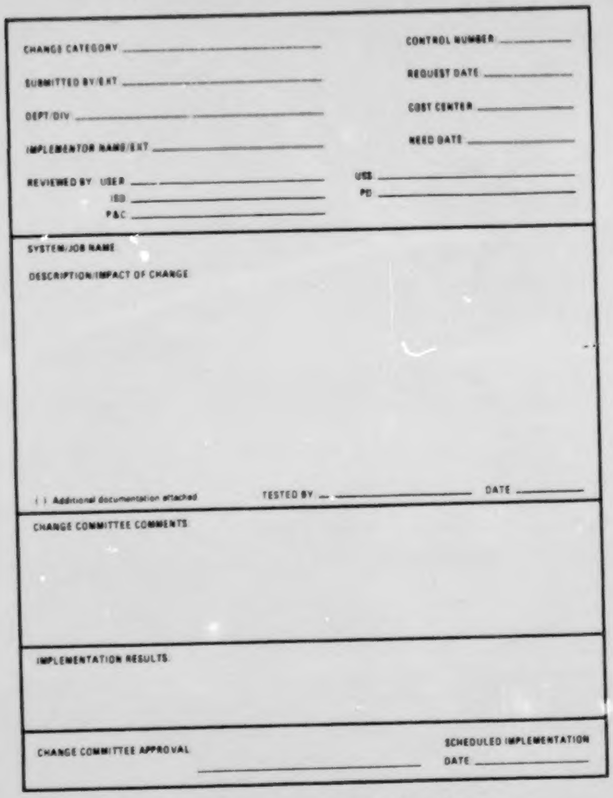
- Category 1: Those changes that have the potential for impacting the production system environment in a major way. These changes are highly visible to all system users, will take a long time to install and will be very difficult to backout.
- Category 2: Those changes affecting only the on-line system. They also have the potential for serious user impact and require involved backout procedures.
- Category 3: Those changes that are visible to the user, but which may be backed out quickly, easily and effectively.
- Category 4: Those changes with a minimal impact on day-to-day events.
- Category E: Those changes of an emergency nature, the kind that are often made at night and are usually temporary, "quick fixes". This category is only assigned and used if a problem has to be fixed immediately, and only if backout procedures are readily available.

Once a change represented by any of these categories is deemed necessary, a change management procedure must be in place which will control and communicate the change effectively along the way, and carry the change through to successful implementation.

THE CHANGE MANAGEMENT PROCEDURE

The change mangement procedure is organized around a number of key players and a document -- the change request (Figure 1). The key players in this scenario are: the submitter of the change, the user whose system is being directly affected by the change, other groups within the data processing organization that may also be affected, computer operations, the data processing documentation group, the change coordinator, the change committee and the implementor of the change.

The procedure that follows describes the sequence and substance of the activities involved, and the responsibilities of the players (the numbers and letters in parenthesis are keyed to the circled numbers and letters in Figure 2):



CHANGE CATEGORY ________ CONTROL NUMBER ________

SUBMITTED BY/EXT ________ REQUEST DATE ________

DEPT/DIV ________ COST CENTER ________

IMPLEMENTOR NAME/EXT ________ NEED DATE ________

REVIEWED BY USER ________ USS ________
ISD ________ PD ________
P&C ________

SYSTEM/JOB NAME

DESCRIPTION/IMPACT OF CHANGE

( ) Additional documentation attached TESTED BY ________ DATE ________

CHANGE COMMITTEE COMMENTS

IMPLEMENTATION RESULTS

CHANGE COMMITTEE APPROVAL ________ SCHEDULED IMPLEMENTATION DATE ________

Figure 1: Information System Change Request

(1) The change request is the document which formally communicates all the necessary information about the change. The submitter of the change completes the information in blocks 1 and 2 of the change request and attaches any supplementary documentation required by departmental standards. For changes that fall into categories 1, 2, 3 and 4, the submitter obtains the signatures of the user and his own supervisor.

If the change impacts other areas within the data processing organization, such as a technical support group, user support group or a systems development group, the approval signatures of those area supervisors are also obtained. The draft, handwritten change request and attached documentation are then submitted to computer operations for their review and approval. After the computer operation's signature has been obtained, the submitter gives a copy of the draft change documentation to the data processing documentation group for publication. The documentation group, who is the authority on all departmental documentation standards and formats, signs the change request at this time.

For emergency changes (category E), only the responsible project analyst's verbal approval is required before implementation. The change request and associated documentation will have to be produced retrospectively in this case.

(2) The submitter forwards the draft change request to the change coordinator. The change coordinator is the central point of control for the change request through the remainder of the change management procedure. All change requests received by the coordinator before a daily cutoff time will be presented to the change committee the following day. The change coordinator assigns a control number to the change request and transcribes essential information about the request on a change control log. This log is used as the agenda for the daily change committee meeting. The change coordinator also audits the change request to make sure it contains all the required information, review signatures, and an attainable need date in light of the current implementation schedule.

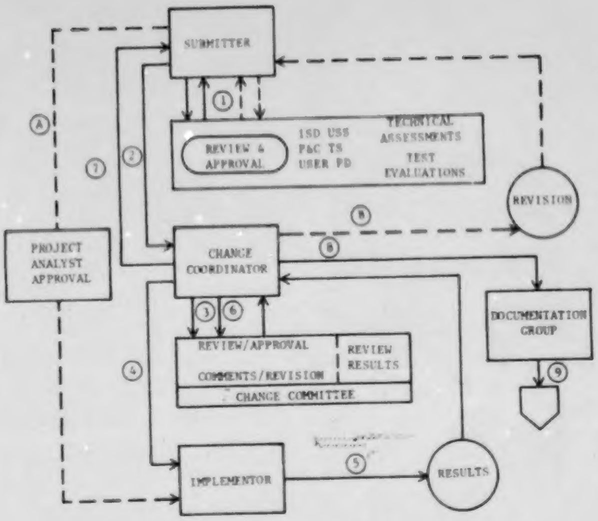


Figure 2: Change Management Procedural Flow

(A) For emergency changes (category E), the change request goes directly to the implementor for installation after the project analyst's verbal approval.

(3) The change coordinator presents the change request to the change committee for their review and approval, or comments and revisions. The change committee meets daily and is composed of managers or their representatives from all groups within the data processing organization. The change committee reviews and approves categories 1, 2, 3 and 4 change requests, sets priorities for implementation, resolves conflicts and disagreements, assigns the required resources and reviews implementation results.

(B) If the change coordinator or members of the change committee detects a problem with the change request, they may opt to return it to the submittor for correction and/or revision. If this occurs, the change request must be processed again through steps 1 and 2, with the appropriate signature blocks initialed.

(4) The change coordinator forwards the approved change request to the implementor for installation. The submitter and the implementor may often be the same person.

(5) The implementor installs the change, documents the results on the change request, keeps a file copy, then sends the remaining copies back to the change coordinator.

(6) The change coordinator reviews with the change committee the results of the change for all change categories.

(7) The change coordinator forwards a copy of the change request and implementation results to the submitter.

(8) The change coordinator forwards the orginal change request

package to the data processing documentation group.

(9) The data processing documentation group sends a copy of the published change documentation to the submitter, the user, and computer operations, and files the original in the documentation library.

This procedure involves all the people who will be affected by the change to the production system environment. The change is tracked through the process by the change coordinator and is controlled by a committee whose members are in a position to understand the affects of the change on the overall production environment. The change request provides the vehicle for communicating the details of the change, as well as the results of the implementation. Thus, by effectively controlling and communicating the change, the two primary objectives of change management are acheived: 1) the impact of the change is minimized and 2) the productivity of personnel is maximized.

CONCLUSION

Management commitment is, of course, the primary ingredient in the successful implementation of change management. While the procedure just outlined may vary from company to company, the concepts of change control and communication are universal. Change management provides visibility and accountability within the data processing environment. Although documentation in general may be an unpalatable activity for many, it is nevertheless essential to the smooth operation of the production environment. Change management provides that documentation even for systems where no documentation previously existed. Most importantly, change management communicates the change to everyone who needs to know about it.

RESPONSIBLE COMMUNICATION: THE MANAGEMENT BRIDGE ACROSS COMPUTER ACTIVITIES

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Chapter STC

The problem most corporate departments encounter with computer activities is how to effectively plan, organize, and direct communication among the various departments which share responsibility for those activities. This paper provides a computer activity management approach that can encompass a variety of computer activities between a data processing staff and end-user departments. The keys to this approach are clear definition and agreement on communication steps among the interacting departments, as well as, specific responsibilities for completing those communication steps. With this approach, users experience an emerging awareness that the correctness, completeness, and accuracy of the data are their ultimate responsibility. The computer's function is just to store, retrieve, calculate, and report the users' data in a manner supportive to the users' daily business.

If you are involved with any aspect of computers on a daily basis, this paper is written for you. Herein you will find a suggested approach, or methodology, for managing the spectrum of computer related activities.

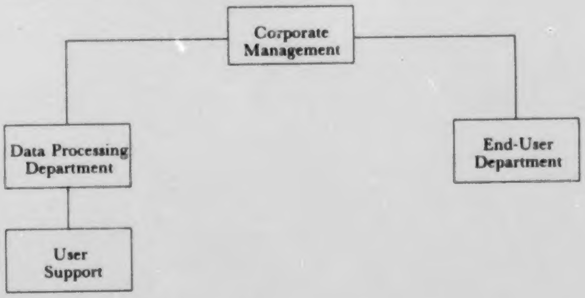
Actually, computer activities are no different from any other cooperative task. The computer itself does not endow any task with a magic formula for success. Use of the computer requires a thoroughness in planning and an attention to detail equal to or surpassing any other business endeavor. The management of computer activities by the approach presented in this paper has been shown to give significant control over the desired outcome of computer related activities. This approach addresses three specific areas:

1. The Communication Path - Interacting Departments and Their Organization
2. A Specific Plan of Communication - The Steps Involved
3. The Relationship of Responsibilities Between the Interacting Departments and the Communication Steps

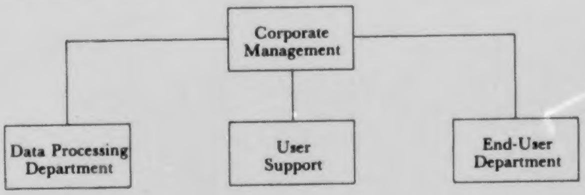
THE COMMUNICATION PATH - INTERACTING DEPARTMENTS AND THEIR ORGANIZATION

Independent of any particular company's organizational chart, a communication path normally emerges that fits into one of three categories. In each category these are the same three generic departments. The first generic department is the computer service itself, whether it is called Data Processing, Information Systems, or the Computer Center. The second generic department is the liaison service which may be called Data Control, User Support, or - as in the case in my company - Computer Utilization. The third generic department is the end-user department, whatever it may be called. The communication path through these generic departments is always Data Processing-to-User Support-to-End User. The different communication path categories are derived by the different User Support upper management. The most common organizational charts dealing with these three categories are given below.

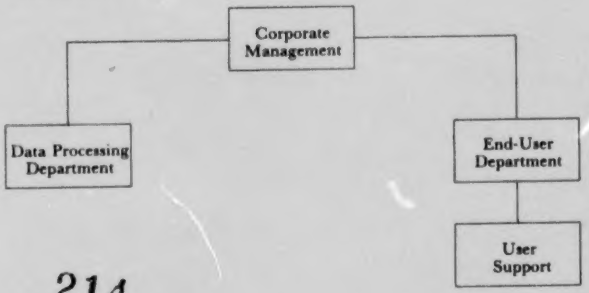
CATEGORY # 1



CATEGORY # 2



CATEGORY # 3



By placing the liaison (User Support) group with the end-users or by making it a separate entity, you help create more user awareness that computer systems are only as good as the user's data - which are the user's responsibility. It is the end-user who should have significant, timely authority over the correctness, completeness and accuracy of the data. It's the computer's function and therefore the responsibility of personnel in that department - to store, retrieve, calculate, and report the users' data in a manner supportive to the users' daily business.

Thus, I suggest a migration of the User Support group from Data Processing, its traditional location, to the end-user department or, to a middle ground on the organizational chart. Because the liaison group must deal both with data processing requirements and with end-user requirements, it is this group that is the focal point in coordinating computer activities in accordance with a specific plan of cummunication.

A SPECIFIC PLAN OF COMMUNICATION - THE STEPS INVOLVED

Any activity, whether computer-based or not, must have a starting step and ending step. This statement seems obvious but there are too many contrary examples of computer activities going on "forever." While a project may continue indefinitely, the management challenge is to dissect the project into discrete activities that have a starting and an ending step. The intervening steps from start to finish must then be defined by the interacting groups in such a way that each intervening step can be readily identified. Consider the following as a general list of intervening steps.

Registration	The first step requires the user to document a request for computer activity and present the written request to the liaison group and to the data processing manager. The data processing manager acknowledges receipt of the request and representatives from the three groups begin analysis of the request. End Product: A written request that is clearly understood by all involved.
New System Design	This is an optional step. It requires the data processing staff, liaison staff, and user staff to plan a major new activity from the management level down to the detail technical level, complete with formal review and written acceptance. It is possible for this step alone to require more than a year to complete; therefore, design methodologies are used to provide additional intervening steps. End Product: A clear definition of the requirement, thorough analysis on how to best achieve the required results, and a specific plan on how to proceed.
Program Specification	The data processing staff reviews the written request and documents a planned solution, outlining the proposed approach. Written acceptance is required by the liaison and the end-user groups to certify that both the proposed approach and the planned deliverable satisfies the original request. End Product: Approved program flow charts; all documentation sufficient to write the program source code.
Program Coding or Modification	This is a data processing staff activity that culminates in an error-free compilation. End Product: A completed computer program, ready to test.
Program Implementation	A formal presentation of the test plan and test results is given to the requesting user group. After completion of the testing, written acceptance is required from the liaison and user group. End Product: A computer program proven to meet the user's request.
Documentation	All documentation, including production procedures, user manual, operating instructions, and programmer specifications manual is written, or if previously in existence - revised, to reflect current activity. This step may be accomplished concurrently with the above steps. End Product: Written instructions and guidelines to accurately and efficiently use the new programming.
Operation	The new programming activity and the documentation is made available to the user group. This provides the user access to the computer programs and procedures originally requested which have now been tested, accepted, and documented. This user access should require no special data processing staff intervention. The computer activity is still considered unfinished. The intent of user acces at this point is to test the correctness of the program corrections or changes in a productional environment. End Product: An opportunity for the user to test the end-product before the activity is considered finished.
Finished	After a specified period of Operation use without errors or problems, the original computer activity requestor gives written acceptance of the activity. Problems discovered after this acceptance are considered new computer activities to be documented and submitted for consideration along with all other computer activity requests. A request of this sort will begin at step one. End Product: A completion of a requested activity that has been fully tested and all phases of activity agreed upon by all involved.

These communication steps can be called "Milestones" because they represent activity completion, each denoting a clear understanding of what is required to reach the next step. As you progress through each milestone you create a continuity that carries your project through to a successful completion. A wall flowchart showing each milestone helps focus attention on problems rather than personalities involved in a project. The flowchart may be used as a guideline in generalized development or as ground rules to satisfy interim requirements. The flowchart also helps you in visualizing which department is responsible for the current phase of activity.

THE RELATIONSHIP OF RESPONSIBILITIES BETWEEN THE INTERACTING DEPARTMENTS AND THE COMMUNICATION STEPS

As computer activities proceed from start to finish, a series of responsibilities emerge. A matrix, or table, must be defined showing the distribution of responsibilities among the interacting groups at each milestone. An example of such a matrix follows:

Milestone	Data Processing	User Support	End-User
Registration	X	X	XX
New System Design	XX	X	X
Program Specification	XX	X	X
Program Coding or Modification	XX		
Program Implementation	XX	X	X
Documentation	X	XX	
Operation	X	XX	X
Finished	X	X	XX

X = Department should be involved
XX = Primary responsibility

Depending on the communication path established and the milestones defined, this responsibility matrix must be completed to the agreement of all interacting groups before the first computer activity can be started.

SUMMARY

This approach has been successfully applied to the management of computer activity in my company. If you are involved with computers on a daily basis, most of the terminology used in this paper should be familiar to you; if not the exact phrases or words, something similar should come to mind. While most of the activity described in this paper is not new, the organization of the activity into the approach suggested in this paper is new. I have omitted the specifics, such as the forms, needed to implement this approach; but, you should be able to take the concept, mold it to your particular company and make it work for you as it has for us.

"YOU CAN'T SHOVEL SNOW WITH A PITCHFORK"

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ABSTRACT:

The preparation of proposals, and technical documents, can appear as a huge snowdrift to the inexperienced person suddenly thrust into the role of manager of such an effort. It is especially true in small to medium-sized firms where there are limits on the personnel available for such an assignment. The effort put forth often can best be described as using a pitchfork to shovel snow!

In our medium-sized operation, we have evolved proposal preparation and technical documentation from this pitchfork approach to a smooth running state-of-the-art snow removal system. The first step was the addition of an experienced communicator with full responsibility for the management of all such projects. Next came procedures; then equipment.

There has been an evolution process with both our procedures and our equipment. The result has been an upgrade of the quality of inputs received from staff and an increase in effectiveness of our finished products.

THE WORKSHOP

This workshop will take you through the management of a proposal effort from initial receipt of a Request For Proposal to the verification of delivery and follow-on efforts. We will utilize proven procedures for RFP analysis, budgeting the proposal effort, planning and scheduling, personnel assignments, copy writing, graphics development, proposal reviews, production techniques, printing and binding, delivery and verification, and the follow-on efforts which can be expected. Hands-on equipment for word processing and for planning will be utilized. Each participant will receive a workbook containing convenient forms and a draft procedure for use in preparation of proposals within his/her organization.

The RFP

They come in all manner of size and format. In each case, someone will have to do an analysis - fast. There is usually a deadline which will seem impossible to meet. This is where the initial use of a standardized method of approach will begin; and where it can reap extra time as the deadline gets closer.

Analysis Methods

We utilize a two-part system. The first part concerns itself with our ability to perform the work described. The second part with what must be done to complete the preparation of the proposal in the time required. A checklist and fill-in-the-blanks format covers a majority of the requests for analysis of our ability to perform the work. What must be done to prepare the proposal can only be analyzed by thoroughly reading the entire RFP and cross checking its requirements. We do this with a wall and with several different color highlighters.

Budgeting

A critical task which involves the estimating of manhours required based on the Analysis, the estimating of production costs and delivery costs. Our estimating system is examined.

Planning and Scheduling

Since the preparation of a proposal is a project of the highest priority, it should be executed using all of the tools that will be proposed for the job for which we are proposing. Thus, we develop a Critical Path Schedule covering all of the tasks which must be performed. A personal computer or a word processor, in some cases, can be utilized for this task. We use both systems.

Personnel Assignments

Who will do the writing? One or two? Or do you have the luxury of a large team? In any situation, there are a lot of tasks to be performed. In the case of the very small group (sometimes it's a group of one), or when there are plenty of bodies, the important thing is to use the best people you can. And, as the Proposal Manager, it is your job to MANAGE, for the most critical work is just ahead. Making assignments and securing agreement.

Copy Writing

It has always seemed to this Professional that every engineer fancies himself as an unrecognized author. Unfortunately, what comes out of the sharp end of their pencils does not often even resemble something worthy of publication. They need guidance. There are a number of guidance systems. We use STOP, GO, SCENARIO, and other systems. None is the magic answer to all your problems, but their use and adaptation to your writers can make your job and theirs much easier. A look at these systems.

Graphics

The old saw, KISS, "keep it simple, stupid", has no better place for application than in proposals. In fact, when the STOP technique is utilized, each page of copy is enforced by an illustration. A look at proposal graphics.

Reviews

A critical review of proposal drafts is an essential part of proposal management. The reviewers should be totally knowledgeable in the proposal evaluation criteria that will be utilized by the client. They should pull no punches. Rewrites, while frustrating to the writers, are better than being nonresponsive or an also ran as far as the final cut is concerned. Review formats.

Production

The use of word processing equipment is a necessity in the preparation of proposals. They play a vital role in every stage of the effort. Each draft can be upgraded and revised without destruction of those pages which have been approved. We use a series of colors for the drafts. These colors tell the reviewers and all concerned just where each page stands in the review effort. A hands on look at word processing equipment.

Printing

Not every medium or small firm has a printing facility. But, almost every firm has some form of electrostatic duplication system. If done right, these machines can do an excellent job in the printing of proposals. In the years ahead, even more advances in this equipment will enable the word processors to feed directly into a machine that will set type, print, and actually collate and bind the finished product. A look at some samples.

Delivery

Time was when we could send most of our proposals by the US Postal Service. Then, things went to pot and the Federal Expresses and Purolators took over. Today, the Postal Service is fighting back with Express Mail. But, for the most part, we put our money, and our proposals in the hands of the couriers and in the hands of our own employees for the assurance they give us. In the long run, the final responsibility is yours as the Proposal Manager. You may have to rent a plane and take it yourself!

Follow-on

Assuming that your proposal has been evaluated as one of the two or three that are most responsive, you will probably be asked to make a verbal presentation to support it. This may be a simple conference at the client's offices or a full blown dog-and-pony-show which can involve everyone that you have proposed. As the proposal manager, you may be the only person with a total awareness of what is in the proposal and how it might be "brought to life" in a verbal or A-V presentation. A schedule is essential.

Conclusion

Within this workshop you will have an opportunity to see, use and discuss each of the areas outlined and to take away from the group an insight into how your fellow proposal managers are coping with these problems.

DESIGN, DEVELOPMENT AND IMPLEMENTATION OF A TOTAL QUALITY CONTROL SYSTEM

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Quality. The most common and urgent concern for all industries - a popular word of the 80's.

We all are aware that many American corporations have recently suffered tremendous losses due to inadequate quality control. Once the problem of poor quality control has been identified, how does one begin to administer the remedy?

This paper will discuss the method of taking a systematic approach to designing and installing a quality program in a technical publications environment. The quality system procedures and policies are based on the requirements of MIL-Q-9858A (a quality military specification) but are readily adaptable to any type of business.

Choosing a quality control team, reorganizing, creating action plans and assigning responsibilities are some topics to be covered. Development of system documentation such as work instructions, writing and production guides, inspection checklists and performance measurement will be discussed in depth.

Designing a quality control system is by no means an easy task but the benefits that are realized (improved productivity and customer satisfaction) are definitely worth the initial investment necessary to incorporate such a program.

In this paper, I will discuss a quality problem that was identified by the United States Air Force quality group and what the offending Pratt & Whitney Aircraft department did to correct the situation. This discussion will include the current thoughts on quality and show relations between improved quality and increased productivity.

QUALITY IS NOT ONE PERSON

The major reason why the previous quality system was deemed as unacceptable was due to the fact that the system lacked participation and coordination with the production groups in the department. The importance of input from the groups who would be the users of the quality system went unrecognized. Naturally, this resulted in resentment and total rejection by the production groups when the quality system descended upon them. In addition to this, the quality system did not incorporate innovative quality concepts such as prevention versus detection and increased productivity. It could only be viewed as the same old words in a new color binder.

Beyond the behavioral and organizational shortcomings, the system also failed to meet the quality requirements of military specifications. It lacked inspection documentation, means of corrective/preventative action and adequate work instructions for the production groups.

Probably the biggest element missing from the program was a total commitment to quality from upper management. The lack of this commitment was readily detected by the Air Force team and it was determined that there was a conflict of interest between profit and the cost of quality - this forced the first major change - reorganization.

GETTING ORGANIZED

The first step in showing total management commitment was to create the positions of Quality Assurance Manager and Quality Control System Administrator. By creating these new positions, various signals were given. First, the Quality Control Supervisor no longer reported directly to the departmental manager (i.e. the "money man"). Although the position of Quality Assurance Manager reports to the departmental manager, he operates autonomously to ensure a high level of product quality. He has the right to overrule the departmental manager where quality issues are concerned. The position of Quality Assurance Manager has given the customer a comfortable feeling that quality will not suffer at the expense of profit.

The position of Quality Control System Administrator was a new job created to ensure on-going quality performance. This individual is responsible for the quality program from a system standpoint. The administrator must ensure that all quality documentation is current and in use by all production personnel. He is also responsible for evaluating all inspection results, monitoring corrective action and performing monthly trend analysis reports. This individual has the authority to conduct investigations when unfavorable trends occur. The constant monitoring and statistical reporting done by the administrator has reinforced to the customer that the quality system is not likely to fall by the wayside.

DEVELOPING A QUALITY SYSTEM

After the quality organization was redefined it was necessary to select a team to design the quality system. The team consisted of two production supervisors, three quality employees and the departmental manager.

The first order of business was to clearly define what the objectives of the team were. A quality policy statement was issued. The next step was to decide how this statement would be accomplished. Twenty-four tasks were defined and accompanied by extremely ambitious milestones.

Along with setting the goals and milestones, clear cut responsibilities were defined. Each member of the team was designated as "responsible" for ensuring their tasks were accomplished within the set time frame. At times, accomplishing the goals of the quality system appeared to be an unsurmountable task. The team, somehow, seemed to perform the ultimate in "performance stretch" and not one milestone was missed.

QUALITY SYSTEM DOCUMENTATION

Because the team consisted of personnel with both production and quality backgrounds, a comprehensive and all encompassing quality system was able to evolve. No stone went unturned. (See Figure 1.)

During the design of the quality system there was a dramatic turn around in philosophy. It was decided that the quality program had to be looked at as more than just an inspection system. It was not cost effective to detect the same nonconformances over and over. Thus evolved the concept of "defect prevention."

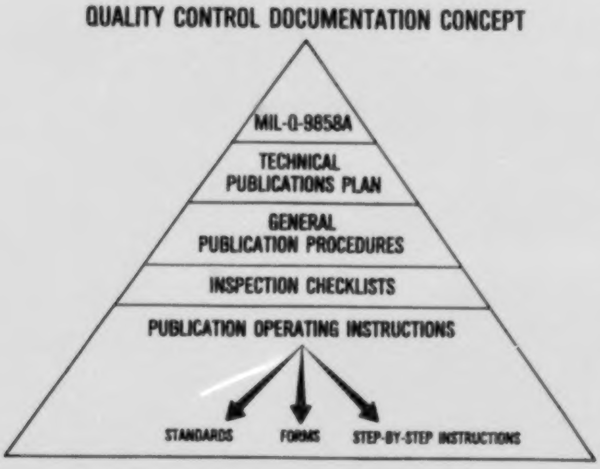

QUALITY CONTROL DOCUMENTATION CONCEPT
MIL-Q-9858A
TECHNICAL PUBLICATIONS PLAN
GENERAL PUBLICATION PROCEDURES
INSPECTION CHECKLISTS
PUBLICATION OPERATING INSTRUCTIONS
STANDARDS
FORMS
STEP-BY-STEP INSTRUCTIONS

Figure 1. Q.C. Documentation Concept

Defect prevention was an unfamiliar term to most of the team participants. The quality personnel had always been viewed as "inspectors."

> "...a change from quality personnel being seen as technically and problem oriented, defensive, powerless, responsible for inspecting and "fixing" failures, and not well respected to their being seen as managerially focused, planning and prevention oriented, assertive, powerful, responsible for preventing failures, and well respected."[1]

Because of this new definition of the quality system, the documentation (i.e., work instructions) that was developed for the production personnel was designed to make the employee do the job correctly - the first time. (See Figure 2.) All the work instructions were developed by the production groups and then reviewed by the quality team to ensure contract compliance. By allowing the future users of the system to have a hand in the development, they had required "ownership" in the program. Rejection of the quality system was minimal.

The next documentation that was developed was the inspection checklist. (See Figure 3.) The checklists were based on the quality characteristics of the work instructions and were tailored to check contract and specification requirements. At this time, all quality personnel were asked to participate in the design of the checklists. Again, personal "ownership" in the system was accomplished.

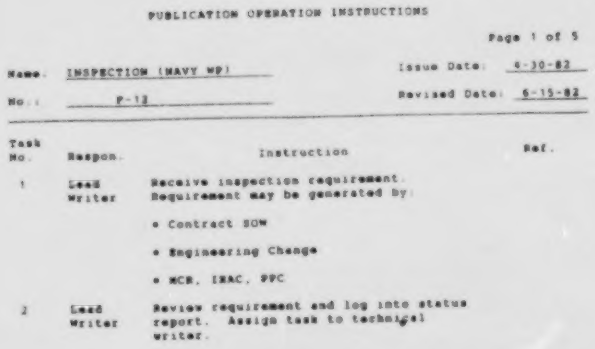
In addition to the inspection system, corrective/preventative action (CPA) was also introduced. The former quality system merely documented nonconformances but never really performed CPA. Personnel were not reinstructed if they made an error nor was the documentation reviewed to ensure correctness. By performing CPA, the rate of nonconformances should be reduced considerably; if not, there is enough available data that allows one to perform an investigation on the problem.

Another new quality function was that of "process compliance." This involves periodic quality inspections to ensure that production personnel have current work instructions and are performing the work in accordance with the instructions. Process compliance checks are unannounced inspections. All nonconformances detected during this type of inspection are documented, analyzed and monitored.

PERFORMANCE MEASUREMENT

After all the quality documentation was developed it became obvious there was a need for statistical summaries - a pulse on the system.

> "Management must measure its progress as it travels the route from defect detection to defect prevention"[2]



PUBLICATION OPERATION INSTRUCTIONS

Page 1 of 5

Name. INSPECTION (NAVY WP) Issue Date: 4-30-82

No.: F-13 Revised Date: 6-15-82

Task No.	Respon.	Instruction	Ref.
1	Lead Writer	Receive inspection requirement. Requirement may be generated by: • Contract SOW • Engineering Change • MCR, IRAC, PPC	
2	Lead Writer	Review requirement and log into status report. Assign task to technical writer.	

Figure 2. Sample Work Instruction

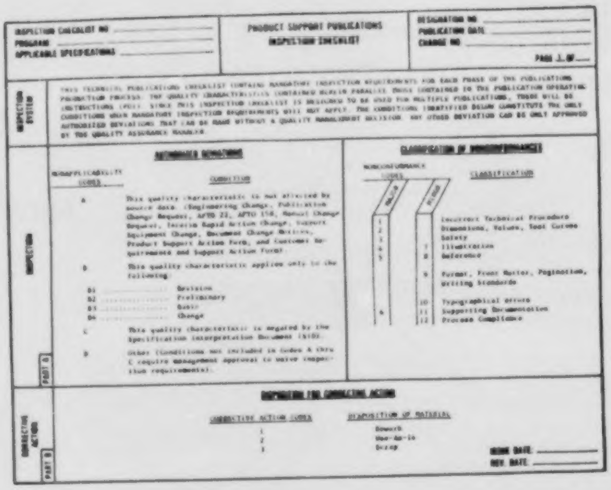
The former system lacked performance measurement. Nonconformance trend analysis is performed on a monthly basis. (See Figure 4.) It is only through this somewhat unsophisticated report that supervision and management can get a feel for the quality performance. Production personnel are not extremely comfortable with the statistical report because it is tangible evidence about their performance (or lack of). It has become supervision's responsibility to evaluate the nonconformance data and submit a "cause/recovery" statement to management.

In addition to the nonconformance trend analysis, cost of quality and delivery performance is also measured. Both of the aforementioned reports are of interest to the customer. It has been found that since the new quality system has been implemented the cost of quality has started to decline and the on-time delivery of error-free technical manuals has increased.

INCREASED PRODUCTIVITY

> "Quality is emphasized in production knowing that quantity will follow ... It is true that if you don't do things twice it only takes half the effort for the same level of production".[3]

It would appear that it would be impossible to increase productivity after this huge paper mill of a quality system was introduced. There were more documentation and sign-off requirements than ever before. In January, 1982 (prior to the new system) there was a delivery performance of 94.4% - acceptable delivery but an unacceptable product. The month of February was when the new quality concept was started and reflects a 20% delivery performance - unacceptable delivery but an error-free product. As the system began to develop, the delivery performance steadily increased. In the month of October, 1982 there was an excellent delivery performance of 96.2% in spite of the quality system.



PRODUCT SUPPORT PUBLICATIONS

INSPECTION CHECKLIST

Figure 3. Inspection Checklist

One reason for the increased productivity was the new idea of customized distribution of work instructions. Each employee has exactly the work instructions needed to do his job. This eliminated the confusion caused by previously having to search through two huge volumes of instructions that applied to all various jobs in the department.

Secondly, a volume of writing standards was established. Standardization was the biggest problem found in the manuals. No two writers would present a repair or disassembly explanation in the same way. Basically, a "do it right, do it once" philosophy evolved.

Lastly, but most important, all the employees had set a personal objective for 1982. They were committed to deliver a quality product and on schedule. Motivating and committing the employees to meeting this objective was accomplished through a management plan.

BEHAVIOR MODIFICATION

The first reaction to the new quality system was one of cynicism and skepticism and in some cases total rejection.

> "The failure rate of the quality programs that have been sanctimoniously shoved down middle management's throat by well intentioned or merely desperate executives argues strongly that techniques rarely solve complex organizational problems."[4]

In the past, quality systems just seemed to appear on a given day. Most employees had no idea what the word "quality" meant or what their responsibilities were. Without the understanding of a quality system concept it is impossible to make it work. "Acceptable quality" must not be left open for personal interpretation but must be clearly defined.

When this system was developed, active participation from the department employees was encouraged. Management clearly stated that a new quality system was coming - and it was here to stay. Management also gave messages that poor quality was unacceptable and would not be tolerated. Most employees chose to participate; the individuals who vocally rejected the quality concept were given quality-related assignments. By pulling in the resistors they were able to understand the reasons and concepts behind the quality systems. All of these disbelievers became converts within a short period of time. We found that most of the cynicism stemmed from "fear of the unknown" and a lack of understanding.

> "....such a investment might, for instance, take the form of adopting a more participative style of management as a way to change workers' attitudes toward quality."5

To keep the participative management on-going, a feedback system was designed. A "Problem Action Report" (PAR) was introduced. The PAR system allows an employee to identify an error in the quality system and requests that they make a recommendation to the solution. These reports are submitted to the quality group and are reviewed. The suggestions are acted upon in a timely manner and the employees are informed as to whether their suggestion was approved or disapproved. If the suggestion was disapproved, a complete explanation of the rejection is provided to the employee. The Problem Action Report program is positive and every attempt is made not to discourage anyone from submitting future suggestions.

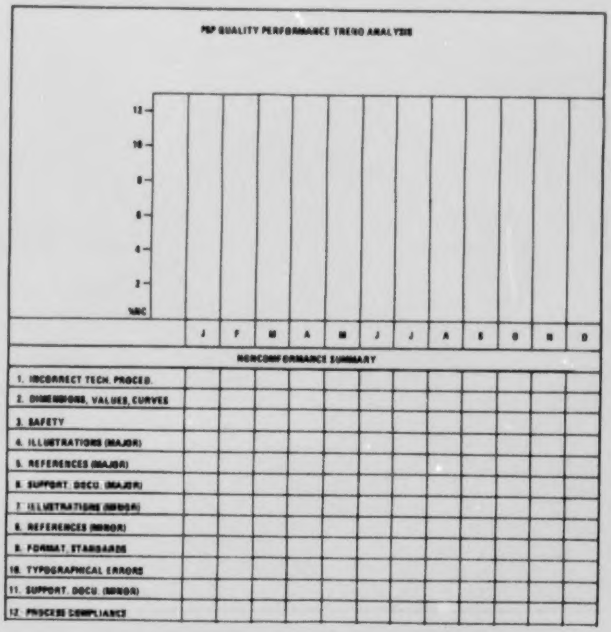


Figure 4. Performance Trend Analysis

THE FUTURE

This quality system is still immature and has not been fine tuned to be as effective and efficient as ultimately expected.

During the next year it is anticipated that we will abandon 100% inspection of the product and develop sampling plans. The sampling plans will become effective when management is assured that an acceptable level of quality has been established. The use of the sampling plan will increase productivity by reducing the size of our inspection team. Some inspection people will be transferred into the production groups.

The concept of quality circles will also be introduced during the upcoming year. The new quality program has exposed everyone to participative management and total commitment to producing a high quality product. Quality circles will enhance this experience by reinforcing the team approach and teaching the employees to set objectives and accomplish them.

SUMMARY

Management commitment to a quality program is a must. Quality must be a part of initial planning in every new program. In short, quality control must become a part of a manager's view on his entire operation.

Organizational changes are often a necessity to develop an effective and long lasting quality program. Responsibilities must be clearly defined and understood by all employees. Most quality systems cannot sufficiently fit into existing organizations.

Detailed and meaningful documentation must be designed. The concept of defect-prevention must be built into the quality documentation. Corrective/preventative action must be on-going to reduce the number of errors.

Lastly, it must be recognized that the quality control system is held together by the employees. Participative management and personal commitment by the employees is the only way the quality system will be effective and will survive. Suggestions for system change must be encouraged and evaluated. Listen to the individuals who are working with the system.

References

1. Frank S. Leonard and W. Earl Sasser, "The Incline of Quality", Harvard Business Review (September - October, 1982), 165.

2. Quality, (August 1980), Q-3.

3. Ibid., Q-19

4. Frank S. Leonard and W. Earl Sasser, "The Incline of Quality", Harvard Business Review (September - October, 1982), 168.

5. Ibid., 167.

DEVELOPING AN ORIENTATION PROGRAM FOR A TECHNICAL PUBLICATIONS COMPONENT

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ABSTRACT

We perceived a need for an orientation packet or program within Honeywell Information Systems' Technical Publications Component based on our experience as new employees. Although one joined the company as an experienced Technical Writer and the other as new to the field, we both felt adrift after the general orientation provided by Employee Relations. With the idea of helping other new employees, we began to think about assembling a general orientation packet usable by the various departments within the component (Software Publications, Hardware Publications, Customer Service Documentation, and Graphics and Production), yet specific enough to be useful. Starting with our own ideas we solicited management support. After initial approval, we requested ideas from current employees. Consolidating our survey results led to a proposal to management. With management approval, we collected and created material for inclusion in an orientation packet provided to every new Technical Publications employee on the first workday. The second part of the proposal has been approved, but not yet implemented: a continuing seminar series introducing new employees to the "who, what, where, and how" of Technical Publications as well as keeping current employees abreast of changes within Technical Publications. This paper discusses our experiences as a case study of steps required for a new employee's orientation procedure.

STEP 1: DEFINING THE GOALS

Deciding that Technical Publications' new employees needed orientation, we realized that to be of any practical use the word "orientation" had to be specifically defined. A series of questions arose. How does "orientation" differ from "training"? Can any orientation program be applied across a functionally varied component, or should such programs be departmental only? Specifically, how were expectations not met regarding our own introduction to the department? Were these expectations realistic? From our vantage point as "old" employees, could we envision practical approaches to meet such expectations? These questions should be asked prior to attempting to organize (or revise) any orientation program. Certainly a specific goal is necessary. Know what **you** desire from the orientation program before approaching others.

We proceeded only when we were satisfied that a real need could be met. The primary goal was "the research and development of a modular orientation program for new technical communications employees". Approaching individual department managers informally, we asked about their initial response to the idea and sought direction and leads. We needed assurance that work already in progress was not being duplicated, and that our efforts would be implemented when finished.

STEP 2: OBTAINING MANAGEMENT SUPPORT

An orientation program cannot be started without management suport. Thus, you must prove that a program is needed and that it will benefit the component. With our specific goals defined, we demonstrated to our department managers initially that there was a need for a good orientation program, and obtained approval to conduct a survey among current employees to determine if the component supported our impression. Step 3 describes the survey.

The survey supported our contention that an orientation program would be useful. After collating the survey results, we approached management with a proposal for implementing an orientation packet, program, or a combination thereof. Along the way, we checked with management receiving advice and approval on how to proceed, people to contact, questions to ask, and what to include.

Always contact management as soon as a goal is defined. Keep them informed of progress and seek aid where necessary. No matter how valuable, no orientation program will be implemented without management support.

STEP 3: THE EMPLOYEE SURVEY

A questionnaire resulted from conversations with department managers and recourse to previous orientation programs. The questionnaire included:

- Personnel data on experience in technical communications at this company and previously
- Availability and perceived usefulness of:
    - A job description
    - An orientation program
    - Pairing with an "experienced" employee
    - Written material
- Perception of the "perfect" orientation program
- Information about orientation at other companies

The questionnaire was first submitted to department managers for approval, with a courtesy copy to section managers. A cover letter to the employees was included to explain the survey's purpose and its end use. We offered to publish the results—unanimously accepted. The department managers approved the survey questionnaire which was then distributed to the entire Technical Publications component.

In one month's time, the survey produced a 25 percent response. The collated results were returned to all respondents, the component manager, department managers and section managers with a cover letter detailing a proposal for an orientation program implementation.

Including current employees serves two purposes: (1) it publicizes the project, encouraging management to implement it, and (2) it lends support to the proposal (assuming that respondents agree with the initial perception of an orientation program need). We can state that both of these purposes were fulfilled.

STEP 4: THE PROPOSAL

Our proposal reflected what we had gleaned from the employees' survey responses as well as our initial perceptions. The respondents' backgrounds and experiences often differed from our own and thus enhanced the proposal. A written packet of materials and a video-taped introductory seminar were suggested. We also asked to meet with management to discuss our proposal and its implementation.

The proposal is the key to the entire project. Until this point management has made no promises. Now they must decide about implementing the orientation program. Therefore, the proposal must be specific enough to show practicality yet general enough to allow negotiation and compromise to attain general agreement and approval.

We met with the component manager and department managers to discuss the proposal. The orientation packet was approved and the contents were detailed and agreed upon. An initial "New Employee Checklist" would be distributed to the component manager, department managers, and section managers to ensure complete agreement on packet contents and who would provide specific elements. The checklist also included a list of nonwritten items that management would provide new employees; i.e., training on the word processing system, building tours, and pairing with an experienced employee. A time schedule for obtaining the items for inclusion was determined. A cover letter to the new employee would be included in the packet explaining the contents plus what the employee should additionally have by way of orientation.

Budget constraints precluded approval of the video-tape portion of the proposal. But a seminar series introducing the various aspects of the component was approved.

We began working on the packet immediately. The checklist would be distributed to management within a day; the packet within six weeks. The seminars would wait until packet approval.

STEP 5: IMPLEMENTATION

The "New Employee Checklist" was quickly written and distributed. No unfavorable comments or suggested changes were received. Therefore, we solicited the information and items required for the packet. Generally, management was cooperative and provided needed information within a month.

The early and continuing inclusion of management in the project aided us in the implementation phase. Without management support, obtaining and assimilating the required material and information in a timely manner would have been difficult.

Our orientation package includes:

- Cover memo explaining purpose and contents of the guide and what else to expect for orientation
- Welcoming letter from the component manager
- Current job description
- Job description for the level above the current one
- Component organization chart
- Department and section descriptions including names of employees within each section
- Documentation workflow chart and narrative
- Policies and procedures summary
- Style Guides
- Word processing User's Guide
- Annual Report
- Monthly roster
- How-to guide for common procedures
- Guide to educational opportunities

A sample orientation packet was sent to management. Upon their approval, the packet was sent to current employees for their critiques.

CONCLUSION

Non-management employees can develop and implement an orientation program. Their views and daily operations allow them to more readily perceive what is needed in such a program. For complete success, each step must be well-organized in advance and have management support and cooperation.

STRESS MANAGEMENT FOR TECHNICAL COMMUNICATORS

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Dallas, TX

Bronson and Gunn are a daughter-father team of stress management experts making their second appearance at an ITCC. When they are not giving workshops, she is a medical editor and he is an industrial psychologist.

Does your job jangle your nerves? Is your boss driving you bonkers? Does your VDT give you the DT's? Do you want to blue-pencil your editor (right through the heart)? Or erase your writers (with a laser)? Then come to our workshop and learn how to manage stress so it doesn't manage you.

WHAT IS STRESS?

From a medical standpoint, stress is the result of exposure to any stimulus, good or bad. Body changes resulting from injury, nervous tension, infection, heat, cold, and the like are stress. So are the excitement of getting married, being told that you've overpaid your income tax and are getting a 5-figure refund, and winning the Super Bowl. In both types of stress, the body undergoes the same nonspecific response, yet good stress (eustress) causes less wear and tear. Thus, how you like what is happening to you determines the effect a stressful stimulus has on you.

WHAT ARE SOME SOURCES OF STRESS?

Obviously, they aren't the same for all of us, but as technical communicators, we have some of the same problems. For example, we may be responsible for getting a project out yet not have the authority to get things done. Also, our work--and, by extension, ourselves--is constantly being picked apart by others (who aren't always good writers themselves). Further, people who are excessively competitive against their own standards of time urgency are more likely to have problems. We'll discuss some of these problems, plus any you want to contribute.

WHAT CAN YOU DO ABOUT STRESS?

Most stress is at least partly self-inflicted: what happens to you is not as important as how you think We'll help you explore the myths that underlie many stress-producing thoughts.

We'll also help you learn to stand up for yourself--how not to be imposed on. Assertiveness will help you protect yourself without antagonizing your coworkers.

Are you doing things, or getting things done? Much stress is the result of poor time management. We have some hints on that, too.

Is your environment creating problems? The modern office is full of objectionable objects that torment our bodies--chairs obviously designed for something other than the human body, copiers that give off toxic fumes, CRT's that glare into our eyes. The study of these things is called ergonomics, and we'll present the findings of much of the current research and offer advice on identifying and minimizing the hazards.

Finally, we'll take you through some of the critical physical techniques in stress management, such as progressive relaxation. And we'll have a handout that will help you use what you learn here to design your own stress control program.

PROBLEM SOLVING: A TECHNIQUE

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As someone stated in the call for papers, managers are problem-solvers. Writers and editors are problem solvers, too. Whichever of these hats you wear, you must continually come up with ways to present information, and often participate in meetings to discuss how a product works or how it should be made to work. Because problem solving is so much a part of management and of the writing process, especially in technical fields, a proven problem solving technique is a boon to writers and managers.

This workshop will introduce you to one problem-solving method. Use it as an aid for giving, receiving, and developing ideas, alone or in a meeting. It can help you increase the efficiency of problem solving meetings or help you to work out an action plan alone.

With this technique, you can clarify your own thinking before you call a meeting with others, determine whether you need a meeting in the first place, and think through solutions before making an action plan.

To apply this problem-solving method successfully, the problem must be something you have control over. The most difficult part of problem-solving is often finding out exactly what the problem is. Many times, we mask the real trouble under its symptoms, or we mope about aspects that we can't control instead of thinking creatively about the aspects we can control.

Bring your problems with you, learn a new technique for dealing with them, and practice working out solutions to problems with other professionals.

Research, Education, and Training Stem

Robert B. DiGiovanni, Manager
Judith A. Steeh, Deputy Manager

Several major notions informed our perception of the Research, Education, and Training Stem of the 30th ITCC. We added the word "training" to recognize the teachers in industrial settings whose activities mainly parallel - and unfortunately seldom intersect - those of teachers in educational institutions. And we gladly accepted proposals for papers or workshops which presented viable concepts for the teaching of technical communication as a practical skill which can help professionals to do their jobs better and students to better prepare themselves for their professions; we were particularly watchful for useful theories or methodologies which attendees could incorporate relatively easily upon their return to work.

We feel our perception has become reality in the panels and workshops - as well as an open forum on certification - which made up our program.

Some of the topics covered in the papers will be of special interest to trainers: developing an in-house technical writing curriculum for scientists and engineers; teaching technical professionals; and training publications staff.

Other subjects will particularly appeal to educators: developing academic technical communication programs; teaching both technical and communication students; and developing student job-hunting skills.

Evidence that the activities of trainers and educators should intersect more than they do is the fact that most of the topics presented in this stem are applicable to all teachers, whether in industry or academia. These topics range from theory (how humans read and understand; general semantics; basic communication concepts; and understandability/comprehensibility in communication) to practical methodologies (techniques for teaching technical communication; using guided design to analyze audiences; applying research to technical writing to develop a document design model; the value of visuals in education and training, or teaching with pictures; and improving major communication products).

Finally, evidence that the activities of trainers and educators are, in fact, beginning to intersect in a meaningful way is offered in presentations like: who's teaching technical communication; moving from academe into the "real" world; and a workshop on internships for students, faculty, and industry.

We trust that you will find the papers in the Research, Education, and Training Stem to be interesting, informative, and useful.

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A PROFILE OF IN-HOUSE TEACHERS OF TECHNICAL COMMUNICATION

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While teachers of in-house courses in technical communication frequently describe their own activities in conferences and journals, few published papers have focused upon in-house teachers as a group, i.e., "company teachers" as a separate breed apart from outside consultants. This paper, based upon a survey of such teachers, provides a revealing profile. The paper describes the in-house teacher's qualifications, motivations, and aspirations; it deals with the teacher's methodologies, successes, and greatest concerns. Perhaps most importantly, it offers practical guidelines to those who teach, who are thinking of becoming in-house teachers or who manage in-house training programs in technical communication.

RATIONALE FOR RESEARCH

Surprisingly few research papers deal *broadly* with in-house teachings as it is done by employes within an organization, i.e., by "company teachers."

Instead, most papers are prepared by (1) company employes who tell about their own courses only or (2) by university faculty and other "outside" consultants who do the same thing.

Occasionally, an author will attempt a panoramic view of in-house teaching by company instructors — but will "lump" findings with those obtained from study of programs conducted by university faculty or commercial consultants. The waters are muddied.

Nonetheless, all of these efforts are (or certainly can be) useful. There are, of course, similarities in what all of these in-house teachers do. But there are also important differences which exist among "inside" and "outside" teachers: in the ways they prepare for a course, conduct it, and follow through; in the ways they are perceived by students and company managements; in the ways they are handicapped and rewarded.

As a company teacher — who on occasion also conducts outside classes — I have some knowledge of these differences and similarities. But I wanted more. Specifically, I wanted to develop, perhaps for the first time anywhere, a detailed profile of in-house teachers who are full-time employees of their organizations.

Sampling. To develop such a profile, I prepared a six-page questionnaire and directed it to in-house teachers. Sampling was done in two phases. From February through early April, 1981, I polled 85 teachers — 28 teachers who contributed to the 1977-80 editions of the Proceedings of our International Technical Communication Conferences and 57 teachers whose names were extracted from a large list supplied by a colleague.[1]

Thirty-two teachers (37%) responded — and I developed a research paper on the results of this survey in connection with advanced degree work being pursued at the University of Michigan.[2]

Over the latter part of April and through June, 1981, I contacted and received responses from 20 more teachers —some of whom were recommended to me by those who responded to the first "call" and some of whom were friends and acquaintances whom I had somehow missed the first time around.

The total sampling, then, consisted of 52 respondees —of whom all but six were "company teachers." The others were managers of such teachers, consultants, or university teachers invited to participate because of their long "in-house" teaching experiences and frequent publication on in-house courses.

Basic Course Details. Of the 52 respondees, 24 said they offered both formal in-house courses and informal training (e.g., small group discussion, one-on-one tutorials.) Twenty-two conducted only formal courses, while six provided only informal training. Nine of the 52 respondees said they also made available other kinds of educational experiences — "correspondence courses," "short seminars," "self-study programs."

Forty-five of the instructors provided titles for 80 courses. More than half of the course titles (56 percent) contain the words, "technical," "writing," or "technical writing." Among those communications-oriented courses with other kinds of titles were "The Logic of Auditing," "Editing for Secretaries," and "Professional Honors Program."

Titles, course outlines, and other survey comments revealed that many organizations tailor entire courses — rather than parts — to their main business. Most respondees said their courses are aimed primarily at scientists, engineers, or managers of such professionals. Relatively few are designed to accommodate technicians, secretaries, or upper management.

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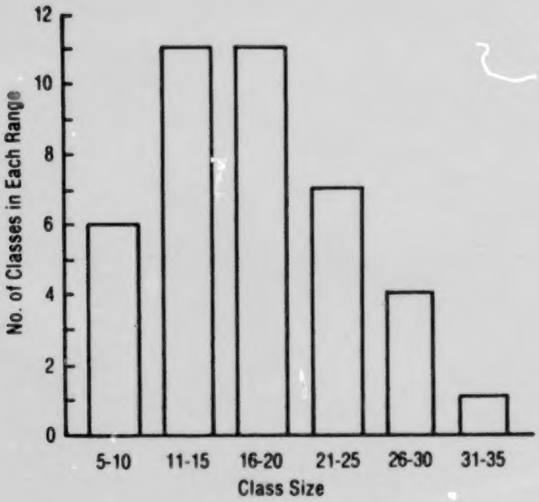


PERCENT USAGE FOR EACH TEACHING METHOD
(50 Respondees)

ACTIVITY	MEAN	MAXIMUM VALUE
1. LECTURE	35.12	80.0
2. DISCUSSION	29.13	80.0
3. WRITING	24.99	88.0
4. GUESTS	2.57	33.5
5. HOME STUDY	2.98	99.9
6. SLIDES	1.75	99.9
7. TEXTS	1.40	80.0
8. ORAL PRES'NS	0.66	38.0
9. FILMS	0.43	10.0
10. ARGUMENT	0.35	20.0
11. EXPERIENTIAL	0.35	15.0
12. GAMES	0.17	10.0
13. TUTORING	0.04	2.5

Forty respondees replied to a question on class size. Of these, 11 reported their average class size to be within the 11-15 range, and an equal number gave an average within the 16-20 range. (See related figure for complete breakdown.) The length of classes and the duration of courses vary widely.

CONTENT, STRATEGY, AND FOLLOW-UP

As a group, in-house instructors deal with a wide variety of communications-oriented topics. Among them are: efficient writing, grammar problems, style, technical content, editing, strategies for giving feedback to writers, graphics, audience analysis, readability, proposals, and grantsmanship.

This variety probably springs from the diverse and particular needs of each organization.

As for teaching methods, three primary methods are used and in roughly equal proportion: (1) lecture; (2) in-class writing or other classroom exercises; (3) group discussion and analysis of writing samples. Used much less are tutoring, home study, games, and guest speakers. (See related table.)

All respondees use instructional aids and most use several. The most popular are handouts, overhead transparencies, videotapes, "personalized" course books or manuals, and audiotapes.

Of special interest to me is the fact that more than a few organizations "build" their own instructional materials (course books) to meet their problems and needs. In some cases, the instructors complement their own books and manuals with a textbook from elsewhere; in others, "company material" is the only material.

One respondee, with the Army, expanded upon her multi-faceted approach as follows: "My philosophy of training is well-conditioned by the Army's plan for instruction: e.g., clear statement of objectives, goals, and supervised on-the job development reinforced by classes, conferences, experiences, reading . . . audiovisual . . . "

One instructor, at a research institute, reflected the ability to streamline his instructional aids as follows: "For my part, I had updated my overheads yearly until this past presentation. This time, I had type set and made reverse slides, with color accents. *Very Effective.*" (His underlining)

Another instructor, also in a research setting, employed a somewhat unusual aid: the completed assignments of course attendees. He distributes these papers in class "to allow participants to evaluate the work of others and therefore learn more themselves and to obtain constructive comments from all members of the group on each group member's work."

Most respondees evaluate their students throughout their course work — applying a variety of methods to determine progress or lack of same. Some instructors rely primarily or exclusively upon in-class quizzes and tests; others combine these methods with evaluations of writing samples.

Some of the more unusual approaches include the following:

- "Six-month feedback sheet/system based on skills learned in the course";
- "Evaluation is made yearly in terms of 'performance appraisal' ";
- "Follow-up survey of supervisors of participants, randomly selected."

A minority uses pre- and post-tests of students. And, as one might expect in in-house courses for professionals, instructors as a rule don't give final exams or grades.

TIME, SUPPORT, REWARDS

To what extent does management allow employees to go to school on company time? Sixty-five percent of the respondees said their courses were conducted during working hours — and only during those hours. Ten percent said their classes were held either after hours or during lunch periods. The remaining teachers reported that some of their courses were held during the day, some after hours. Also in this group were those who had a class meeting in split fashion, e.g., from noon to 2 p.m.

One teacher in a university setting offered this comment: "We pick one of the university's many holidays, expect the people to show up informally, feed them a good lunch, and expect them to contribute the day to their own advancement."

Like many teachers elsewhere, the typical in-house instructor invests a significant amount of off-hour time to preparing for class and evaluating student papers. In most cases, the "investment" ranged from one to five hours weekly — with four hours being the most common response. Only five teachers said unequivocably that they were paid for this effort.

Boost from Management. Almost half of the respondees said that executive management gave "strong" support to their programs and an almost equally large segment reported "moderate" backing. Here are representative responses to the question: "To what extent does top management support your program?"

- "Totally, completely. Encourages enrollment by salary incentives, talks, etc."
- "Director of Laboratory has suggested that all personnel take technical writing training and recommended that technical writing always be offered as part of the Lab's in-house education program. Associate Laboratory directors have acted as guest lecturers."
- "Strong top management support. Top management (Director of R&E) participates in the workshop."
- "Our Associate Provost for Research always gives the luncheon speech (always a good one) and he also signs the invitation letter."

Those instructors with less-than-resounding support commented as follows:

- "Half support it. The other half acknowledge the need but feel that project work is too important to take time for writing courses or that expensive 'outside' consultants would be more effective."
- "I have heard nothing from top management."
- "Light support down through middle levels of management. No direct involvement."

The critical importance of top-level backing is mirrored in this observation: "My management supports the program somewhat by encouraging employees to attend. (But) any corporate communication endeavor must have the sanctioning of a high level executive to be truly effective. I spend much of my time justifying my course with management which is constantly changing."

Altruism Evident. Asked to identify the major source of satisfaction from teaching, 51 percent of the respondees, in one way or another, said, "helping students." Variations on this theme ran as follows: "helping students devise ways of solving communication problems at work". . . "seeing people develop their personnel skill inventory". . . "seeing somebody catch on". . . and "watching participants 'unfreeze' their writing skills."

Another sizeable segment — 26 percent — cited the "fun" or "thrill" they gained from effectively presenting their material. One noted "the thrill of presenting stimulating material in a way that others . . . act upon it." Another gained pleasure from "presenting material which appears dull in an unusually interesting manner and then seeing it click." One remarked: "It's like a shot in the arm compared to routine college teaching." Still another said simply: "The feeling that I'm good at it . . . "

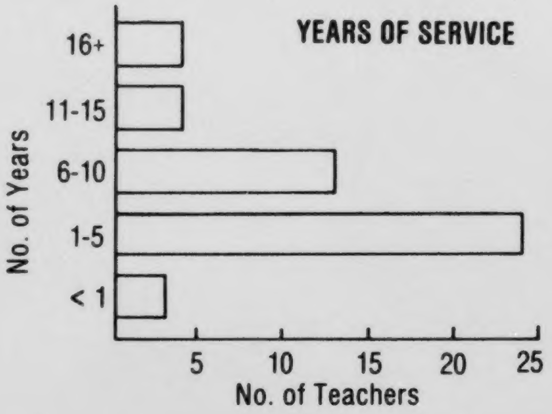
Of the 23 percent who cited other major sources of satisfaction, only one teacher said "financial remuneration."

Only 52% of the teachers said their efforts led to one or more of the following: promotion, increased prestige, higher pay.

One of these instructors said: "Personally, I am looking for neither prestige nor higher pay, but both have come my way! (The fact that I teach a course at a local college for $1.00 a year — and have for years — suggests that I enjoy teaching per se!)

A LOOK BACK - A LOOK AHEAD

As one might expect, most in-house teachers involved in this survey were not new to the job. The 48 who reported their length of service averaged slightly more than six years in the classroom. Their combined years of service totaled 299. The veteran of the group had 20 years in — while the newest teachers had less than one year. (See related illustration.)



How did most of these respondees get involved in inhouse teaching? Many of their responses can be summarized this way: the organization felt it needed a course and I expressed an interest in teaching it. Typical comments were:

- "Our in-house education group...enlisted my help."
- "My interest — in conjunction with a need for more teachers."
- "Applied for a position that was open in the organization."
- "By volunteering in order to improve the corporate communication structure."

PROFILE OF AN IN-HOUSE TEACHER

Tends to provide both formal and informal instruction

Uses writing exercises and classroom discussion almost as much as lectures

Sometimes "builds" own company-oriented textbooks

Doesn't give grades or final exams

Enjoys 'strong' to 'moderate' support from management

Reveals major source of satisfaction is 'helping people progress'

While one teacher said "The need to improve in-house written communication was recognized by executive management," another reported, "I saw a need/use for it and sold cognizant top management on the idea."

Some were called on to teach because of their writing experience within their organizations or on past jobs. As one such writer explains: "I was (among) the few practicing technical writers in the area, so when the Lab's Professional Education Program was set up and technical writing was identified as a desirable component of that program, I was brought in as a consultant in curriculum development."

Others were invited to teach primarily because they had taught elsewhere. Recalls one: "I taught high school English years ago and eventually discovered training as a profession. My bridge was writing training manuals. With the communication/training background, I was a likely candidate..."

While a college degree in English is the most common among the respondees, many other degrees are cited — among them, degrees in journalism, German, mass communications, education, meteorology, linguistics, and speech.

More than a few of the respondees had extensive experience in both teaching and writing.

Girding for the Role. When asked how they would prepare for in-house teaching if they were starting over, those surveyed offered a variety of answers. Perhaps the most common wish, though not expressed by a large number, was for prior teaching experience. Other replies included: "Exposure to basic engineering"; "Greater familiarity with department-related subjects"; and "Knowledge of the organizational setting (how things really get done in the real work-world)."

Most in-house teachers continue to add to their proficiency in both formal and informal ways. Some take "how to teach" courses and seminars; others enroll in various communication courses. Those engaged in informal learning experiences talk about such activities as intensive reading, publishing in journals, and constantly evaluating their teaching. (One mentions completing Dr. Robert F. Mager's course on Criterion Referenced Instruction.)

Self-Perceptions. The teachers responding to this poll see themselves as having certain strengths and shortcomings. As for the former, more than a few believe they can bring practicality to the classroom better than any outside teachers can. One notes: "The goal of this program is to develop proficiency in writing. This is of greater importance than formal credit as in a university course. The greatest emphasis is on the practical application of skills . . . "

Another remarks: "In-house training programs, if professionally done, are more effective than outside courses."

One respondee perhaps best summarized the advantages of working on an in-house basis when he observed: "I do something different each time I teach a class or work with an author or train a new editor because every person's background, talents, needs, goals . . . differ."

As for "wants and needs," in-house teachers cite the following:

- "We like to learn how other people overcome the same problems we face."
- "A wider knowledge of how others had already done it (teach in-house) elsewhere."
- "I believe one area is denigrated or ignored: grammar."
- "I've often wondered how teachers present outlining. Aside from my own method, I have never seen or read anything that sounded very effective."
- "In my experience, most seminars and workbooks on writing operate on theory — too much background — and not enough utilitarian (material)."
- "More help in translating academic teaching techniques to the practical, immediately applicable techniques of industrial, R&D training."

Reflecting upon these opinions (and similar opinions from other respondees), I'm convinced that in-house teachers and those on the outside can gain much through heightened interaction. Open and broad sharing of problems, ideas, and strategies can't help but lead to better teaching and more effective learning — *wherever technical communication is taught.*

NOTES

1. For 67 percent of the names and addresses included in the mailing list for the first phase of my survey, I am indebted to Prof. L. W. Denton, then an Associate Professor of English and Director of Auburn University's Division of Applied Writing.
2. The first phase of this survey was detailed in *A Profile of In-House Teachers of Technical Communication*, a research paper prepared for the Graduate Program in Adult and Continuing Education, University of Michigan, Ann Arbor, Mich., Winter Term, 1981.

ED239282

ARE ACADEMIA AND INDUSTRY THINKING ALIKE:
Does the Right Hand Know What the Left Hand is Doing?

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This paper is an assessment by an engineering educator of the current situation in the teaching of technical communication in academic and in industrial circles. One major difference between education and training is discussed and how this difference affects instruction that one finds in colleges and in businesses. Suggestions on how instruction in these two areas can be made more complementary are made, and models of efforts in purely technical subjects are offered as possibilites. Results of a small survey of writing teachers are included. The need, the interest, and the means for better cooperation are present; what is lacking are those willing to provide leadership.

INTRODUCTION

The relationship between what students learn in college and what is needed in the work world has many interesting aspects; some fuel debate, others demonstrate unity of purpose. The discussion that follows is one person's observations, tempered by those solicited from others, about this relationship in the area of technical communication.

One might view the obvious goal of academia as preparing students so well that upon graduation they would be the adept communicators desired by industry. However, in general, our present educational system does not yield such results.

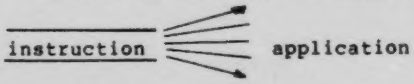
As an engineering educator with over 30 years of teaching experience--much of which in the last five years has been devoted to improving the communication skills of engineering students--I have been able to reflect upon how academia thinks and works. As one who two years ago spent a sabbatical year as a full time member of the editorial staff at Lawrence Livermore National Laboratory, I have also had opportunity (limited as it was in many ways) to have functioned as a communicator in a work-world setting. This dual background has led to the observations that follow about common outlooks and goals in academia and industry and about problems of integrating instruction in technical communication within academia with effective application in industry.

EDUCATION OR TRAINING?

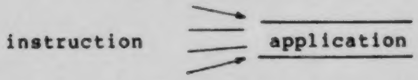
I see many of the differences in how technical communication is taught arising from the basic nature of the instruction. A distinction proposed by B. F. Skinner, a noted learning theorist, seems to be appropriate here. Skinner viewed education (which mostly takes place in academia) as a set of experiences that develop an individual. These experiences include theories, principles, and abstractions. Education may also include general guidance, often by limited and carefully selected examples, on how to apply the principles. Thus, education focuses on a set of material that is intended for a spectrum of future applications, which at the time are unknown for the individual student.

On the other hand, Skinner viewed training as a set of experiences that teach a person to do a specific job. In training, there is a funneling of past experiences, along with current instruction, into a narrow, known, specific application. These two views can be expressed visually as follows.

A view of EDUCATION (Academia)



A view of TRAINING (Industry)



When training has to supply instruction that is not specific to the job, education may have failed, or could be improved.

MODELS FOR MEETING NEEDS

Emphasis on communication is increasing; estimates are that over half of all jobs can now be classed as communication jobs. Consequently, there is an awareness of increasing need for help in writing. The nature of the writing process is being more closely studied in view of needs and effectiveness.

CS 208094

It may be well to compare the situation that exists in technical communication with that in other areas in which industry expects academia to provide a foundation. In such areas as computer graphics, robotics, and microprocessors, industry is often far ahead of what is being taught in academia. Two major reasons are, first, the lack of funds for suitable equipment and, secondly, a shortage of faculty who are knowledgeable in the frontiers of the area. The increasing use of faculty as consultants (who learn along with their employers in endustry) and increasing numbers of equipment grants by industry are helping to bridge the gap in these technological areas. Just as industry and academia are beginning to work more closely in these areas, so must they develop ways to work together in communication areas to bridge gaps there.

For example, the American Association of Engineering Societies (AAES) recently released for reader comment two sets of initiatives for academia and industry with the goal of alleviating the engineering college faculty shortage. (1) Why not a similar effort with the goal of producing a set of initiatives for academia and industry to improve the instruction and application of technical communication? Benefits might range from increased understanding to, possibly, new integrated programs not yet conceived.

I see the need for programs that give those in academia who teach technical communication the opportunity to see first hand what the writing needs of industry are--and not only see it, but experience it by working along with the authors as they struggle with a memo or a document. Only when the faculty member, essentially serving as an editor, comes to know the company well enough to advise about the purpose and audience of a specific document will he understand the type of thinking that he must get his students to use.

Similarly, we need companies in industry with the desire and willingness to provide people to work with communications classes as observers and advisors. Then, there will be true understanding of changes that need to be made to improve the "education" side of the team. It will, however, take staunch faculty members to unflinchingly submit to such scrutiny.

Academia wants to supply qualified graduates--and industry wants to find them. To this extent they think alike.

THE CURRENT SITUATION IN INDUSTRY

Many companies frequently feel that the level of communication skills of newly graduated employees is less than adequate. As a result, efforts are made to improve communication skills either by encouraging extension type courses, through instruction by in-house people, or by retaining a consultant to work with individual employees or give workshops for groups. While each of these approaches is effective to a point, none is a cure-all.

Extension courses are often taught by academic faculty who have no real appreciation for or experience with on-the-job writing. In-house instructors may know the writing needs of the company but may be poor teachers, with the result that although employees may complete a course, they may have learned little of permanent value. Seminars may be valuable and inspirational for a time, but unless an in-house advocate maintains motivation, the long range value may be small.

Considering my limited experience outside academia, it is difficult for me to generalize with confidence. However, I suspect that there are many situations in business and industry, public and private, where the following observations and conclusion are reasonably valid.

.. Many in positions of editorial responsibility have had little or no formal instruction in the principles of technical communication (as distinct from other types of writing), or in the content area of the writing, or both.

.. Trainers who are recruited from editorial staffs to conduct courses in communication skills often have no background in educational methods and therefore are frequently not able to facilitate, motivate, or "get away from the book."

.. Each company has its own style, procedures, and formats that are to be reflected in what is written. In-house trainers have no problems along these lines, but it is often difficult for an outside consultant to be truly effective without extensive orientation, which may be the exception rather than the rule when a training program is scheduled.

.. Organizations with in-house training may offer relatively few courses that are aimed at improving the writing process or courses that help one become a better writer. (A course in general problem solving techniques can be very valuable when one realizes that the task of developing a document is a problem to be solved.) While courses in human relationships are valuable in a work environment, one cannot assume that principles learned in a course of this type will be handled effectively in written form.

.. Unless editing by an officially recognized editing group is mandated, many documents will be edited within a department by colleagues or a secretary. While all the information in the resulting document may be technically correct and there may be no errors in English, the expertise of a professional editor may be sorely lacking.

.. Memos, letters, and in-house documents seldom are reviewed by professional editors. However, many writers of these will readily admit that they know little about recognized principles of organization, audience analysis, and purpose.

.. Many courses in communication skills are "completed" by employees who have been urged to take them but who, for one reason or another, do not continue to apply what they were taught.

THE CURRENT SITUATION IN ACADEMIA

Academia is well aware that graduates, the product of the educational setting, should be useful to employers. In general, both faculty and students want curricula that develop communication skills that graduates need. However, several mitigating circumstances lower the liklihood of all graduates having the skills that the employers desire.

.. Types of writing required in academia and the circumstances under which that writing is produced may vary greatly from the types and situations under which writing will be done on the job.

.. Teachers who are generally aware of the previous point may not feel that the differences are important, or they may not know how to remedy the situation in their own instruction.

.. Few engineering or science faculty have had formal training in technical communication, a subject area only now emerging as a recognized discipline.

.. Faculty who have published and are satisfied with their writing skills may actually have been accepted for their scholarship, and indeed may be poor communicators. When such faculty provide instruction and direction in writing to students, mediocrity is perpetuated under a blanket of false security.

One of the problems seen facing academia today was summed up by Robert Mager who, in developing the idea that academicians may learn a great deal from industry about instruction, said:

> "...This is not because industrial trainers are any smarter than academicians, but because industry has been working to implement the instructional state of the art, while academia appears to be digging in its heels to preserve archaic instructional practices." (2)

RESULTS FROM AN INFORMAL SURVEY

Before concluding, I will share some responses to an informal survey sheet I distributed recently at two small conferences for technical writers. These responses included:

.. The present level of cooperation between academia and industry was rated as moderate (4 to 5 on a basis of 1 to 10). The level reasonably possible was rated higher (5 to 8), and the desirable level was rated a bit higher than that (6 to 9).

.. College teachers of technical communication were seen to be only marginally (5 to 7) acquainted with actual communication needs of business and industry, and graduates were rated as sub-marginally prepared (3 to 5) in technical communication as they began their first jobs.

.. Industry can be more helpful by: making more of their people available to address classes; allowing freer access to literature that industrial personnel produce; letting students visit facilities and talk to workers; offering internships; providing money so that classes can be smaller; providing actual examples and explaining the human elements, not the theoretical; taking the initiative.

.. Academia can be more helpful by: providing consulting services, editing aid, joint studies; offering certificates or minors in communication to non-majors; being willing to learn while risking the "not knowing" of technical communiction; constantly pushing for information that keeps teachers aware of the currentness of their methods.

.. Strengths in training programs were seen as: specific, directly applicable instruction; awareness of shortcomings and trying to train to cope with them; technical language proficiency; specific and comprehensive programs; good sense of what in a communication situation is practical and readable.

.. Weaknesses in training programs were seen as: excessive reduction to correctness by formula with too little sense of process; misplaced emphasis on grammar and mechanics; failure to recognize that training requires special employees and well organized approaches; concentration on technical terminology; lack of teaching skills; sometimes being so specific that only an expert within the field can benefit.

.. To improve the quality of instuction in technical communication in college: group students by work majors; have many guest speakers and many practical examples; have uniform standards so classes are not subject to individual interpretation by each teacher; emphasize process of writing, audience analysis, and revision more and "correct" format and indoctrination less; stimulate interaction between teachers and practitioners.

Some comments from respondents who have teaching experience in both academia and industry were found to reflect interesting perspectives. Athough the five statements were from different people, they seem in the order below to form a synthesized summary of current thinking and prospects for the future in technical communication.

.. "Consulting in technical communiction is to the tech communicator what a library project is to, say, a medieval literature specialist."

.. "So many consultants that I have met seem ill informed and superficial in their basic knowledge of tech writing means and methods. It seems to me the desire is to make bucks rather than offer substantial benefits to a company."

.. "Adult education classes in Tech Writing are, as a group, very bad indeed. Most of the instructors they find for these offerings don't have the foggiest idea how tech writers work."

.. "Business people tend to distrust academic people's practicality; a bridge must be built."

.. "We seem to be in a transitional period during which the teaching of technical communication is becoming institutionalized. To facilitate this process, we surely need augmented cross-talk between academia and industry. ... My own feeling is that the schools are really picking up the ball, although not yet fully developed."

WHAT CAN BE DONE

Basically, I see two major fronts. On one, many faculty who are either unwilling, unqualified, or incapable of providing the type of instruction that is needed in the changing climate of technical communication. On the other, industry needs to assess what entry levels of communication skills are needed and then inform academia, much as a thoughtful manager would present clear specifications to a prospective vendor.

I will close by proposing some ways that academia and industry could help each other reduce technical communication problems. Some are already successfully being used; some are in the developmental stages; some are untried possibilities.

.. Programs of summer work opportunities for faculty to learn company needs while assisting employees in improving writing.

.. Industry could provide good communicators to work with an individual faculty member in a specific course as a reviewer or consultant on student reports.

.. More texts in technical communication with examples from actual communication situations within actual companies--adapted to preserve company interests and identity.

.. Initiatives by industry to provide students and classes with opportunities to develop or revise documents (publicity brochures, in-house newsletters, instruction sheets or manuals).

.. Consortia consisting of industrial firms and academic institutions, to identify the communication needs of the firms and ways in which they can be met, either through education or training avenues. See (3).

.. Development of instructional modules, with industry aid, to assist in teaching writing to technical students. See (4).

.. Integrate instruction in technical communication into existing senior laboratory courses that require written reports. See (5).

.. Efforts to determine what the true basics are in technical communication--basics that when supplemented with examples supplied by industry, would adequately prepare graduates for a wide variety of employment.

.. Faculty development programs that prepare faculty to help students "learn how to cope." Learning to cope would mean that the student must not only learn facts but also current procedures, thinking, and examples through practical experiences.

SUMMARY

In summary, academia and industry think alike in general terms--each wants graduates to be competent in entry level communication skills and be able to handle more complex communication tasks as advances come. Beyond that point, academics often have little idea of what "real world" communication needs are, or what curriculum would prepare students for coping with these needs. On the other hand, industry often resigns itself to "filling in the gaps" in communication skills just as it has had to do in training employees in technical areas.

Can each industry discover the essence of "education" essential to the specific training needs of the company? Can academia look beyond its current and sometimes cloistered view of the needs of the world and, in cooperation with industry, discover threads that trace through both education and training?

We need resolve by both parties to understand the problems and the possibilities they share. There are ways to bring thinking and goals nearer, but they take time, effort, and money. The danger may be that we who are faculty members are waiting for industry to take the initiative, while industry is waiting for academia to take the first step. So, those who would help us all accomplish what we all want--please step forward and lead the way!

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ED239283

TEACHING TECHNICAL EDITING:
A STRUCTURED APPROACH

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ABSTRACT

Most technical editing courses and workshops offer instruction in a loose assortment of topics, such as preparing style sheets and working with authors. There appears to be no logical progression from beginning through intermediate to advanced levels. This paper describes a way of organizing a technical editing course so that students learn both analytical and mechanical skills in an orderly, structured way.

Introduction

Like most skills, editing must be learned bottom-up and practiced top-down. We have to begin with basics and work through intermediate to advanced levels. In teaching editing, this means starting with the simplest units that editors work with - words - and progressing by stages to more complex tasks like manuscript analysis and criticism. Most editing courses or workshops are unstructured in that they present a hodgepodge of topics with no apparent logical progression from simple to complex.

Editing also encompasses both mental processes and mechanical skills - thinking and doing - and it is essential to teach both. Typical editing courses tend to stress the latter, with emphasis on correcting faulty grammar and syntax. They seem in effect to duplicate what is generally taught in English, writing, and rhetoric classes, with a few additional topics like preparing style sheets, proofreading, and working with authors.

Course Objectives

The primary objective of the course is to teach the analytical and critical skills required for good editing, rather than to conduct an English grammar review. There are two prerequisites for the course: the first is that students are expected to come to class with a firm grip on spelling, punctuation and grammar. The reason is simple. You cannot expect to correct someone else's grammar if your own is shaky. A musician auditioning for a symphony orchestra is assumed to know how to play an instrument well, read music fluently, and keep time. If he can't, he has no business attempting to join an orchestra. Likewise, no one who doesn't already possess outstanding language skills belongs in editing. To assess students' mastery of English fundamentals, I give a short quiz during the first class, and suggest that people who score below a certain grade should consider some other line of work, or at least begin serious grammar review.

The other prerequisite is writing competence. If you can't write, you can't edit. As self-evident as this is, or should be, it raises eyebrows all over the classroom. Again, the reason is simple: It's fairly obvious that you wouldn't sign on as music critic for the Times if you have a tin ear, or as an art reviewer if you never studied art. Yet the same people who wouldn't dream of doing either don't hesitate to sign up for an editing course, though they may by their own admission be poor writers. The assumption (however unconscious) seems to be that if you can't write but want to do something literary, editing is the next best thing. ("Those who can, write; those who can't, edit.") But you cannot presume to evaluate or edit anyone else's writing if you can't produce passable prose yourself. This is not to imply that editors need be authors in their own right - clearly most are not. But they must have enough sense of literary style not only to diagnose poor writing but to prescribe a cure.

Another objective of the course is to teach students to be the type of editors who offer creative help to authors, not merely last minute proofreading and copy editing. When Big Business backed into publishing without really knowing what it was doing, it overlooked this crucial kind of editorial assistance. Consequently, many scientist- and engineer-authors have no idea that they should have this help, or even what it is. More than just substantive editing, it is a partnership in the development and presentation of ideas, reminiscent of the traditional editor-author relationship in trade publishing.

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Course Structure and Content

The course is divided into four major segments: copy editing, content editing, development editing, and science interpretation, with more than 100 topics arbitrarily distributed among them. It is paced to equalize the workload, and to gradually build students' skills in editing for clarity and analyzing and criticizing text.

To teach these skills required starting from scratch in developing course materials. Because no adequate text exists, I rely on handouts - copies of relevant articles, hard copy of slides, and summaries of lecture material - as well as guest lecturers and live editor-author conferences. I also use Words Into Type, mainly because it is a perennially useful reference book; readings are assigned to accompany the topics discussed each week in class.

Two kinds of homework and classwork help students develop proficiency in editing technical writing: a series of short practice exercises, each of which concentrates on a specific editorial process, skill, or problem, and manuscripts from different scientific and engineering disciplines. The manuscripts contain most of the problems common to technical writing, and require students to apply what they learn in the lectures and practice exercises. The practice drills, which serve as warm-ups for the full-dress editing assignments, cover such things as reducing wordiness, sentence content analysis, and critical reading, as well as editorial techniques like enumeration, abridging, and verbalizing and pictorializing statistics.

An editor-author conference is scheduled with a writer with whom I am currently working. Instead of going over the manuscript at the office, we do it in class. Students are given copies of the text in advance and asked to write out questions for the author.

Guest lecturers discuss subjects in which I am neither expert nor interested, but which my students need to know about, such as production and printing and software documentation.

Conclusions

A structured approach to teaching technical editing supplies the sense of direction missing in nonstructured courses. Subjects are presented in logical sequence, and the assignments take students from introductory through intermediate and advanced levels of editing. Students' homework showed steady improvement in analytical and critical abilities and editing skill. They also reported marked improvement in their writing.

The same structure can serve equally well for company training programs for technical editors. It also serves as the basis for an in-house workshop I conduct called "Editing for Engineers" which uses essentially the same structure as the full-length course, but in condensed form.

The structured approach can thus serve as a model for teaching technical editing to different audiences, and as an indirect way of improving writing skill.

ED239284

TRAINING THE TECHNICAL EDITOR

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The need for people skilled in technical editing is increasing as society places increasing emphasis on the need for accurate, concise, and complete technical data. As many organizations do not have in-house programs for training technical editors, there exists a need to provide inexperienced people with basic editing skills. This paper discusses two classes that meet this need.

The first class is designed to provide an understanding of the publication process and of basic editing skills. Editing skills are approached from a pyramid process: Exercises and lectures move from simple concepts, such as shortening phrases and sentences and rewriting sentences for syntactical purposes, to more complex concepts, such as rewriting paragraphs and short articles. The student is also exposed to the requirements and uses of graphic and tabular material and to the editor's responsibilities to the writer, audience, and management.

The second class is designed to provide advanced editing skills. Although much emphasis is placed on the various types of editing and their appropriate uses, there are also sessions on paragraph techniques and language and the preparation of abstracts, summaries, and titles. Also included are lectures on the writer-editor relationship, the publication process, and publications management (schedules, budgets, and organizations). Both classes are modular and any portion can be expanded and used to provide specialized training to a specialized group, e.g., managers, scientists, or writers.

INTRODUCTION TO TECHNICAL EDITING

At the completion of this course, students are capable of producing clear, concise, and accurate documentation and they understand the relationship of editing, graphics, automated text processing, and printing. Students are given editing exercises which are discussed together with reasons why a certain type of approach is preferable. Class participation is actively encouraged, as are questions during the lecture.

The Publication Process

The six steps of the publication process – editing, writer (or author) conferences, production, proofreading, printing, and distribution – are defined.

EDITING. The standard definition of editing, i.e., reworking written technical material for a specialized audience, is explained. Although it is emphasized that this can involve various degrees of work, i.e., from a simple copyedit to a total rewriting effort, students are given basic editing guidelines which ensure clarity and can be used in all situations: (1) correcting grammar, punctuation, and spelling; (2) checking the organization to ensure that the flow of thought is logical and smooth; (3) verifying the text with other manuscript elements; (4) checking values and units of measurement; (5) watching for inconsistencies in mechanical expression that could confuse the reader; and (6) making changes only when needed.[1]

The policy for revisions is addressed. Students are cautioned against making changes solely for stylistic preferences, and the editorial principles related to objectivity, skepticism, and reader consciousness are defined.[2]

WRITER CONFERENCES. Ways to maintain a good working relationship with writers, which is necessary for any technical editor who hopes to succeed in this profession, are discussed. The emphasis is on how to convince the writer of needed changes by demonstrating the improved clarity, conciseness, and meaning of the document provided by the editing. Also included are techniques for handling writers who discuss every change, on "assuaging" the ego of the writer, and on dealing with writer changes.

PRODUCTION. A brief overview of the production process is provided. Students are told of the necessity of staying informed of changing trends and new technologies in these fields and of how a good working knowledge of production techniques is used to establish schedules and oversee costs.

PROOFREADING. This is defined as crossreading by two people: one reading from the original copy and one checking the typeset material for errors. An explanation as to why editors must be familiar with proofreading is provided.

PRINTING: Emphasis is on the basic knowledge of printing techniques that an editor requires to assist the writer, e.g., the use of color, treatment of halftones, and different printing technologies.

DISTRIBUTION: Distribution is discussed from the viewpoint of dissemination of information. Included is information on data bases and the types of audiences interested in different documentation.

Report Types

Various types of documentation, e.g., research reports, journal articles, brochures, presentations, proposals, and technical manuals, are discussed. As this class is oriented toward those who require basic editing skills, there is only a brief discussion of how editing varies with different types of documentation. It is emphasized that although technical editors usually specialize in a certain documentation type, e.g., hardware manuals or research reports or proposals, the same basic editing skills are required. Factors that differ are the editor's subject-matter knowledge, the documentation's format and content requirements, and the level of writing based on the intended audience.

CS 208 096

Style Guides

The thrust of this lecture is use of basic style guides and in-house guides which provide a firm's stylistic requirements. Information is provided on acceptance or rejection of guidelines for particular projects or document types and categorization of guides for specific documents.

Report Organization

The organization of a report is divided into three sections: introductory material, the main body, and supporting material.

Included in the introductory material are the cover, title page, abstract, and table of contents. The cover is considered to be a standard design providing a form of corporate identification. The purpose, adequacy, and necessity of the basic elements of a cover, e.g., titles, dissemination restrictions, and author identification, are discussed. Problems associated with abstract preparation, e.g., the summarization of a document's salient points, are given particular attention. The discussion of the table of contents is focused on when it should be included, how it should quickly reveal the report's organization, and how it substitutes for an index in a small report.

The body of the report is defined as background material and basic technical data. The data to be included in background material, e.g., purpose, scope, and approach, are defined. The lecture on the basic data is oriented to show how these data must support the document's results, conclusions, and recommendations.

The final section includes supplementary material, such as a reference list, bibliography, glossary, and the appendices.[3]

The lecture concludes with information on other forms of report organizations, when they should be used, and the editor's role in suggesting alternate approaches.

Headings

Information on three heading schemes is provided. The first is textual which is explained in terms of indentation, capitalization, and font. The second and third are numerical, both indented and flush. Examples of when each type should be used, their advantages and disadvantages, and the importance of headings in organizing a technical document are discussed. Also included is how to number tables, illustrations, equations, and references to agree with numerical text headings.[4]

Proofreading

Information on proofreading is included in this course, as the technical editor must be able to mark copy for production personnel. The system discussed, Simplified Proofreading, is intended for the nonprofessional proofreader who must sometimes read proof. It was developed by Peggy Smith of Editorial Experts. Terms such as copy, character, lowercase, subscript, superscript, type, and typeface are defined, and general rules are provided. There is also a discussion as to where the majority of typographical errors are found.[5]

Basic Editing Techniques

The lectures on editing techniques progress from rewriting sentences to obtain clarity to reorganizing sentences within paragraphs to reordering paragraphs and sections of an entire manuscript. Information on parallel construction, factual errors, mathematics, hyphenation, acronyms, and sexually biased language is included. All lectures are followed by exercises.

In addition to the grammar, punctuation, and spelling edit, discussions include how to check for omissions and duplications in pagination, footnotes, outlines, and lists; for alphabetical and numerical order; for sequential items in data such as flow charts; and for standardization of symbology. Also discussed is how a style sheet for complicated manuscripts assists the editor.

The next lecture is concerned with syntax. Included are basic instructions on avoiding complex sentences, pomposity, noun clusters, passive voice, verb tense changes, and unclear references. There is also a separate discussion on the use of parallelism.

The next lecture concerns basic methods for checking for factual errors. Three basic techniques are provided: checking for agreement between the text and other manuscript elements, ensuring consistency in values and units of measurements, and avoiding inconsistencies in style of mechanical expression that can cause confusion and result in disagreement between the text, artwork, and tabular material.[6]

Sexism in language is discussed in general terms. Methods for avoiding gender-biased language are provided, and the problems of implied sexism in words and graphic displays are discussed.

Hyphenation and acronyms are discussed from the viewpoint of technical language. The use of hyphens to avoid ambiguity with compound adjectives is emphasized. Other discussions include hyphenation in regard to compound nouns, prefixes (particularly when the word changes meaning without the hyphen), compound numbers, and compounds of time and measurement. Suspending hyphens are also mentioned.[7] Included in the lecture on acronyms are the importance of distinguishing between acronyms, abbreviations, and letter symbols and the editor's role in ensuring that the meanings of such terms are clear to the reader.

Artwork

This session centers on the use of artwork as a means to clarify or emphasize a concept or relationship more forcefully than can be done with words alone. Artwork is classified into graphs, bar charts, pie charts, photographs, technical illustrations, and engineering drawings. Definitions and uses of each type are presented.

Also discussed are the principles of presentation, textual references to data within the artwork, captions, the independence of the artwork from the text, data to include in artwork, and agreement of the text and artwork. Special emphasis is given to graphs so that the students understand legends, abscissas and ordinates, tic marks and grid lines, scales, and logarithmic power.[8]

Tabular Material

Tabular material is approached from the viewpoint that research produces data in the form of numbers with accompanying experimental conditions and observations which must be included in the report. As these data must be presented clearly and concisely, the easiest method is tabular format. Included are guidelines on numbering tables, major components of a table, effective organization of a table, integration of the text and table, establishment of the table's independence from the text, and identification of a formal table. The editor's responsibilities for the basic layout of the table, for removing extraneous material from the text and arranging it in tabular format, for ensuring agreement of the tabular data and the text, and for determining the placement of tabular material in the text or in an appendix are discussed.[9]

Mathematics

General editorial rules include the need to distinguish between letters and symbology, to identify foreign letters, to mark subscripts and superscripts, and to simplify complex equations. Also discussed are spacing, splitting long equations, equations in sequence, aggregation symbols and special notations, displayed versus in-text equations, and equation numbering. The editor's role in simplifying equations and ensuring the clarity of their meaning is emphasized.[10]

ADVANCED TECHNICAL EDITING

At the completion of this course, students are trained in techniques required to advance beyond minor technical editing tasks. They have gained skills in abstract preparation, titling, publications management, and paragraphing.

Students are given editing exercises which are either reviewed by the instructor or discussed in class. Also included are several guest lecturers who discuss topics related to a particular session.

Levels of Edit

There is a discussion on copy editing versus technical editing. To understand what is meant by technical editing, the Jet Propulsion Laboratory's five levels of edit are discussed.[11] Students are then asked to relate these to their work situations and explain how they would apply them to different documentation types.

Documentation Types

The discussion is centered on how to edit different documentation types, e.g., presentations, proposals, hardware and software manuals, instructional materials, research reports, and journal articles. The relationship of audience type and comprehension skills is explained in terms of its impact on the technical editor's role. Also briefly discussed is the use of style guides and format specifications in determining how to edit a particular document.

Publications Management

Included is information on scheduling, budgeting, management, and publications organizations. Scheduling is discussed from the viewpoint of the five levels of edit and how they are used to meet time schedules. Budgeting is approached from the concept of charging for publication costs by the page or by the hour; advantages and disadvantages of each method are pointed out. The importance of the technical editor to management is stressed; information is included on determining the types of publications required by an organization and methods to convey this information to management. Different publication organizations, e.g., government, commercial, and academic, are mentioned; included is a discussion concerning the functional location of editors and editor responsibilities.

The session concludes with a discussion by managers of several large publication organizations.

Writer-Editor Relationships

This lecture deals with the role and relationship of the editor and writer and the responsibilities of each in the publication process. Included are what changes the editor should accept from the writer, how the editor contributes to the qualities that characterize good writing, and how the editor interacts with the writer when problems arise concerning scheduling, style, and management concerns.

This session also includes a lecture by scientific and engineering personnel on their interpretations of the roles of the editor and the writer and their respective responsibilities.

Publications Process

Information is provided on advanced composition, artwork, and printing practices. The purpose is to convey information on not only the physical aspects of these processes, but also on why the editor must understand them to schedule a document. How to establish and maintain a good working relationship with the personnel involved with these processes is discussed.

The session concludes with a round table discussion between a compositor, printer, illustrator, and editor on how all four must interact to produce a quality document that meets scheduling and financial constraints.

Paragraphing

Five types of paragraphs – introduction, transition, text, review, and summary – and their uses in technical editing are discussed. Other aspects of paragraphs included in this lecture are paragraph movement and its role in technical editing, the utility of paragraphs, and the organizations of paragraphs. Special emphasis is given to the development of summarizing topic sentences and their role in technical editing.[12]

Jargon and Ambiguity

Information on jargon includes guidelines on how to recognize it in technical language, when it should be used, and the development of standards to judge its qualities. There is also a discussion as to why jargon exists in technical language. Particular emphasis is given to the editor's role in the acceptance of jargon.[13] The discussion on ambiguity includes its definition, the difference between vagueness and ambiguity, how to identify and resolve ambiguity, and the types and levels of amgibuity.[14]

Abstracts, Summaries, and Titles

The definition of an abstract, what is required of a good abstract (content, length, and readability), kinds of abstracts, and how to write abstracts for different audiences are included in this lecture. Particular emphasis is given to the last item, as the editor must often prepare the abstract as part of the editing task. There is also a brief discussion on the development of international standards for abstracts.

Summaries are approached from the viewpoint of how they differ from abstracts. Information is included on how to write a summary and how to evaluate the effectiveness of a summary.

Considerable attention is devoted to titles because of their importance to the technical article. Discussion is centered on the title and its relationship to report usage, the purpose and definition of main titles and subtitles, and guidelines for writing titles and subtitles.[15]

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EMPLOYEE DEVELOPMENT GUIDELINES FOR TECHNICAL ILLUSTRATION STAFF

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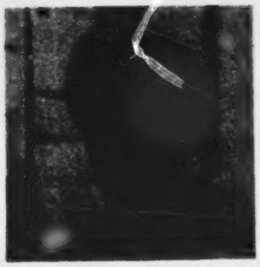

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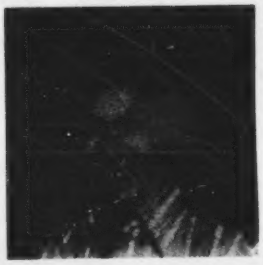

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Abstract

Faced with the twin challenges of employee turnover and changing customer needs, the ERIM Art Unit Group Leader and the Publications Supervisor designed the "Guidelines for Employee Development." The Guidelines represent a planned, systematic response to a changing, not well organized situation. By using the Guidelines, a supervisor can, through discussions with each staff member, develop individualized training and skills development programs while simultaneously ensuring that the necessary Illustrator skills are always available to meet customer needs.

How the Guidelines Work

One set of Guidelines is assigned to each staff member (but is physically retained by the Group Leader) and serves as a personalized, written record of the employee's progress (and the supervisor's attention to that progress).

The Guidelines themselves consist primarily of 3 columns (lists) of skills and mechanical abilities. (See the figure.) The intent of the six month and one year columns is to ensure that by the end of those respective time frames new or present staff possess the skills and mechanical abilities to work independently on the jobs listed and produce correct, quality products. For each item, this is the common goal for both staff member and Group Leader. A check mark in a square box reminds the Group Leader that a particular employee has been exposed to and has some familiarity with the job involved. The purpose of the box is to indicate whether or not there has been any movement (progress) toward the goal. A date in a rectangular box indicates the date when, according to the judgment of the Group Leader, the employee acquired the skills to work independently on the job involved and carry it through to completion with only general supervision. In the "real" world, obviously, there are variations. For example, a new hire might learn some of the one year skills before some of the six month skills. The intent, however, is to adhere to the list as closely as practicable. The column of "Advanced" skills and abilities lists those which a staff member might learn within 2-4 years.

The "Comments" page is for any information the Group Leader wishes to record that cannot be covered by the list. The comments may be directly related to an employee's technical skills, such as "Learns quickly," "Works faster than average," or "Generally competent but the quality of work is not consistent," etc. Or, they may not relate directly to an employee's technical skills but rather to overall job performance such as "Communicates clearly and precisely with customers and members of the Publication's Staff," or "Refuses to work with the customers he/she doesn't like."

The procedures are as follows. After an initial 'skills and mechanics assessment' meeting is conducted by the Group Leader with each employee, the individual lists and comments sheets are revised at set, weekly intervals by the Group Leader based on the work accomplished during that week. The Group Leader again meets with each employee once every two months to evaluate employee progress, possible opportunities, and to discuss problems (if any) in meeting the goals listed. Put simply, it is the staff member's task to learn or improve his/her skills at whatever level - i.e., to get a date in every rectangular box. It is the task of the Group Leader to work with each staff member (or delegate another to do so), to ensure that the staff member gets the opportunity and variety of experience required, and to keep records (documentation) of this activity. The information collected on these lists are used as one input to the yearly staff evaluations. No employee is evaluated on where they start on the list, but rather on the progress they have made during a given time frame. All employees are encouraged to keep their own notes and bring them to the bimonthly meetings.

Efforts to raise a staff member's skill level or improve job performance generally may take several forms depending, for example, upon the skill involved, the employee's background, or the time frame in which the skill must be acquired. Generally speaking, training takes one or more of the following forms:

1. The Group Leader works closely with the staff member, especially a new hire, during an initial training period. For example, the new hire is included in discussions between the Group Leader (or his/her delegate) and the customer whenever a customer brings a job for the new hire to work on. The Group Leader then supervises the job to ensure it is correctly done.
2. Staff members may vist other Units, such as photography or reproduction, to facilitate understanding and communication between the units and to show Art staff how these other units do their job and what information they need to support the Art staff.
3. The Group Leader may use reminders or give instructions at staff meetings or on an individual basis.
4. The Art staff is able to refer to a "how to" notebook put together by the entire staff.
5. The Art staff can develop a notebook of periodical articles to refer to on current techniques.
6. Art staff are encouraged to take technical illustration and similar courses offered by local colleges.
7. Art staff may attend equipment demonstrations, in-house seminars, out-of-house training sessions, etc., as needed, and report to the Group Leader or entire department, as appropriate, on things learned.
8. Art staff may attend meetings with Art customers, especially organizational meetings for larger projects.
9. Art staff may get direct field experience according to the requirements of a given job.
10. The Group Leader spot-checks work of the Art staff.

Budget and Time Considerations

It took only 36-40 hours to formulate the Guidelines, draw the forms, and introduce the program to the Art staff. After almost 1 year of operation, the bimonthly meetings with the 3 Art staff involved and the associated recordkeeping are taking about 20 hours total time annually. Obviously, the amount of time (and money) involved in a program of this type will vary depending upon the number of Art staff members, their experience, the ability of the supervisor to identify the skills required, etc.

Benefits and Limitations

Probably the most significant benefit of the program is that it is an alive, on-going process. Skills and abilities can be added or deleted at the stroke of a pen according to the changing needs of the Art unit or its customers. The lists are always current, timely, and responsive to change. This distinguishes them from job descriptions which are usually more general, list some things an employee should know but not what they should learn, have no time deadlines attached to the skills that they do list, and tend to become obsolete and are often ignored.

Other benefits include:

- Both the staff member and supervisor begin the job with a common, agreed to understanding of where the employee is in terms of skill level, what they need to learn (i.e., where they are going), and within what time frame. The program represents a commitment by both parties to each other and to the job. The importance of having this common understanding and commitment is a point often stressed in management by objectives (MBO) writings.
- The simplified recordkeeping means that progress and performance is easily reviewed by the supervisor, the employee, the Department Manager, or others. This is especially valuable for staff evaluations (of both the employee and the supervisor), promotions, demotions or dismissals, or complaints by staff members.
- Yearly evaluations tend to be more accurate, not reflecting just recent events.
- The education and training is geared to the needs of the specific employee.
- The bimonthly meetings help to ensure continuous communication between the staff and supervisor.
- The skills listed are continuously matched against customer requests for service to help ensure that the Art unit is responsive to customer needs.

The primary limitation of the program is that while the Guidelines list skills to be learned and time frames in which to learn them, they do not list standards of performance. The STC publication "estimating illustration costs, a guide," though dated, can help with setting standards or at least identifying commonly accepted standards. Obviously, standards can be affected by several factors, such as the equipment available in your particular department, or the kind and complexity of the rough draft material you are given, for example.

Summary and Conclusions

The Guidelines have been in use for over a year. During this time three benefits stand out above the others as particularly noteworthy. Above all, the Guidelines promote communication between the illustrator and the Group Leader. Conversations are private and allow for open discussion and problem solving. Secondly, staff training has been targeted at individual needs. Thirdly, the annual evaluations (a second round of evaluations using the Guidelines is coming up shortly) reflect the entire year's activities, not just the last few weeks, and contain no surprises since the regular bimonthly discussions have included a review of problems, accomplishments, and other matters.

GOALS FOR ART DEPARTMENT PERSONNEL - INDIVIDUAL LIST

NAME:

DATE OF HIRE:

6 MONTHS

SKILLS. Staff member will know or be able to draw, layup, reproduce, create from samples, copy fit, or prepare for Photo or Repro Departments the following:

☐ ☐ Brochures
☐ ☐ Business Cards
☐ ☐ Certificates
☐ ☐ Flyers
☐ ☐ Framing
☐ ☐ Glossies for Half-tones
☐ ☐ Invitations
☐ ☐ Mark copy for Photo
☐ ☐ Mark copy for Repro
☐ ☐ Mounting
☐ ☐ Overlays
☐ ☐ Presstype from Negatives
☐ ☐ Posters
☐ ☐ Report Covers
☐ ☐ Report Figures
☐ ☐ Security Classification Markings
☐ ☐ Symbols: Chemical, Greek
☐ ☐ Tickets
☐ ☐ Type: Style, Sizes
☐ ☐ Units: English, SI.
☐ ☐ Viewgraphs

Or, other skills as determined by the Group Leader.

MECHANICS. Staff member will be skilled in use and care of the following:

☐ ☐ Camera in Repro
☐ ☐ Camera in Art Room
☐ ☐ Compugraphic Typesetter
☐ ☐ Exacto Knife
☐ ☐ Headliner
☐ ☐ NuArc Platemaker
☐ ☐ Pens
☐ ☐ Proportional Wheel (scale)
☐ ☐ Triangle, T Square

Or, other mechanical abilities as determined by the Group Leader.

1 YEAR

SKILLS. Staff member will know or be able to draw, design, conceptualize, plan, make, layout, or copy fit or prepare for Photo or Repro Departments the following:

☐ ☐ Brochures
☐ ☐ Cartooning
☐ ☐ Color Separation
☐ ☐ Displays
☐ ☐ Forms
☐ ☐ Maps/Mosiacs
☐ ☐ Matting
☐ ☐ Montages
☐ ☐ Multiple Page Layout
☐ ☐ Organization Charts
☐ ☐ Posters
☐ ☐ Presstype
☐ ☐ Slides
☐ ☐ Staff News
☐ ☐ Type Fitting

Or, other skills as determined by the Group Leader.

MECHANICS. Staff member will be skilled in use and care of the following:

☐ ☐ Engineering Proportional Divider
☐ ☐ Mat Cutter

Or, other mechanical abilities as determined by the Group Leader.

ADVANCED

SKILLS Staff member will know or be able to do the following:

☐ ☐ Airbrush
☐ ☐ Charts and Graphs
☐ ☐ Conceptualize
☐ ☐ Design Brochures *
☐ ☐ Engineering Drafting
☐ ☐ Group Lead Projects *
☐ ☐ Mathematical Calculations*
☐ ☐ Perspective Drawings
☐ ☐ Principles and Practices of Scientific and Technical Illustration *
☐ ☐
☐ ☐ Rendering

Or, other skills as determined by the Group Leader.

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*Required of a Technical Illustrator II

MECHANICS Staff member will be skilled in the use and care of the following:

☐ ☐ Airbrush
☐ ☐ Perspective Board, Associated Tools
☐ ☐ 35 mm Camera
☐ ☐ Other Available Tools

Or, other mechanical abilities as determined by the Group Leader.

ED239285

An Overview of Clarkson's Technical Communications Program

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The TC program at Clarkson offers students twenty-three courses ranging from the humanities oriented Interpersonal Behavior to the science oriented Engineering and Scientific Report Writing to the technically oriented Computer Documentation and Technical Manuals. Students gain hands-on experience in practical application and learn communication theory to support their knowledge of how people communicate. The following script for the slide presentation demonstrates the combination of skills and opportunities TC majors learn at Clarkson.

Twenty-two American colleges offer a Bachelor of Science degree in Technical Communications. Thirteen offer a BS degree; nine offer a BA degree; one, Oregon State University, offers both. As one would believe, most of these programs have roots from both the humanities and the sciences. Clarkson's TC program grew out of a humanities department in a school known chiefly for its engineering.

I've organized a slide presentation to illustrate the features in our TC program. Like fifteen other TC programs, it offers an internship in business or industry where TC seniors experience firsthand participation in positions they will hold in the future. We offer twenty-three communication courses for students to take simultaneously with their technical courses so that they may develop ways to translate and transmit their technical knowledge.

I'll begin by showing you the slides.

Script for Slide Presentation

Clarkson College offers a Bachelor of Science degree in Technical Communications. For those high school or community college graduates who imagine themselves publishing scientific articles or computer documentation manuals, composing advertising copy, creating designs for technical magazines, or having their own radio or TV show to demonstrate their technical knowledge, our program helps them achieve these ends.

The changes which have occurred in our modern technical world direct our attention more and more toward the necessity for people to use that complex information; and because the trend is audience communication, Clarkson TC majors learn the latest technology and simultaneously acquire the expertise to translate that information.

Each TC student with the help of his or her advisor works out a pattern of courses appropriate to the career goal that he or she has set. The courses focus on skills in research, on overcoming the number one fear in America--public speaking, on graphic design and audio-visual material, on listening, and especially on writing and editing. In addition to the TC courses each major chooses a technical specialty for a professional concentration, such as industrial engineering, physics, math, accounting, economics, or finance.

A TC major may elect to do an independent study and in his or her senior year to intern for a semester by working in a business, in public relations, publications design, computer documentation, or other similar areas so that they can gain on-the-job experience and work with experts in their chosen fields.

The principal advantage of Clarkson's TC courses is the latest theory which our well qualified and experienced faculty offers. Our chairperson, Mary Lay, Ph.D. (University of New Mexico), teaches Advertising, Rhetoric, Publications, Technical Journalism, and Theory and Philosophy of Communication. Bradford Broughton, Ph.D. (University of Pennsylvania), teaches Letter Writing and Speech. David Craig, Ph.D. (University of Notre Dame), teaches Business and Industrial Report Writing Interpersonal Behavior, and Business and Professional Speaking. Herbert Smith, Ph.D. (Kent State University), teaches Technical Editing, Business and Industrial Report Writing, and Rhetoric. William Dennis Horn, Ph.D. (University of California), teaches Computer Documentation and Engineering and Scientific Report Writing. Faye Serio, M.F.A. (University of Notre Dame), teaches Graphics and Audio-Visuals and Photography. Patricia Barkman, Ph.D. (Indiana University of

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Pennsylvania), teaches Rhetoric, Public Speaking, Interpersonal Behavior, Mass Media in Society, and Theory and Philosophy of Communication. Catherine Hunt, M.A. (University of Ottawa), teaches Public Speaking and Business and Professional Speaking. Eve Walsh Stoddard, Ph.D. (University of California), teaches Rhetoric and Letter Writing.

Another reason why the TC program at Clarkson appeals to students is because the Career Services Office helps students to approach the job market so that they are successful in obtaining positions that are right for them. Career Services offers a course called Life/Work Planning.

The entire TC faculty encourages students to think for themselves, to question their values, and to achieve responsibility. Because classes are deliberately kept small, students receive as much personal attention as they desire.

The study of technical communications at Clarkson encourages many opportunities for development of a multi-faceted career. All of our TC graduates hold positions in public relations, mass media, management, or publications, or in a combination of those roles.

New discoveries often result from a combination of ideas from two or more disciplines. The technical communications major at Clarkson can double-major or can graduate with two degrees: one in TC and one in either engineering, computer science, or any of the other nineteen programs which Clarkson offers.

The TC Department offers a 15-hour TC concentration to all 3900 Clarkson students; thus, students from other disciplines interact with the TC majors. (Here they are on a field trip to the Ogdensburg Journal, where they are learning how a large newspaper company operates.)

Each of us lives in a rapidly changing world. The TC program offered at Clarkson keeps pace with the changes in technology and in communication theory so that our graduates have meaningful professions and integrated life styles. At Clarkson we strive for personal initiative and intellectual independence. Our graduates have shown that those who can get their ideas across and make themselves heard and recognized move ahead fast.

ED239286

ACADEMIC TECHNICAL COMMUNICATION PROGRAMS: MEETING CHANGING DEMANDS

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ABSTRACT

As technologies change more rapidly and become more specialized, and the products of technology take over many of the more mechanical functions once performed by both technical communicators and users of material prepared by technical communicators, communicators are faced with greater and more complex responsibilities. For example, the advent of more sophisticated uses of the computer for research, writing, editing, and production, requires the technical communicator to be aware of and to be able to manage all stages of the communication process. Academic technical communication programs must prepare students for these current and future career demands by offering them a broader range of educational experiences than those associated with written communication and technical areas of interest.

In 1981, I presented a paper at this conference which advanced the thesis that a technical communication program needs two major components if it is to be successful. The two components discussed were, first, a communication core, and second, a cognate, an area of study in science or technology. The two-component basis offered success for both undergraduate and graduate programs. At that time, I used the graduate program at Bowling Green State University as an example of a successful program which included both components.

In that presentation I did not explicitly define success, although I had a good idea of what I meant by the term, that is, that the programs would provide students the kinds of experiences they would need to be most productive as technical communicators when they left the university, and that employers would be returning to the programs to do their recruiting. I have basically the same definition of success now that I had then, but I've since refined substantially my conception of the components required for success. After two years' additional observation and experience, I have been asked to review the basis offered for successful technical communication programs and discuss some new demands I believe have been placed upon these programs.

Before beginning that review and discussion, I'd like to note here, and I will emphasize later on, that the demands made upon academic technical communication programs are constantly changing, evolving as rapidly as do the media used for research, writing, editing, production and dissemination of technical information. And it's a challenge to any program only to keep abreast of these various developments much less incorporate them into programs which seem to survive more by sheer will and demand from students than by internal support from the university or external support from industry. Witness, for example, the diminution of internship programs as the economy began to decline. One of the best methods academic programs have to ensure that they are graduating students who are keeping up with the changing demands upon technical communicators has been threatened by industry cuts in the programs for which academic institutions have neither financial nor experiential resources to compensate.

Two primary concerns of technical communication programs, however, are still to provide students the opportunity to gain knowledge in both communication and in science or technology. The best method of providing access to knowledge in non-communication areas is to establish a system in which technical communication students take courses in the departments of scientific or technical interest. It is useful, certainly, to have students prepare projects in their communications courses involving the area of their interest, but it is still more useful to have them simultaneously involved in courses in the technical and communications areas. This scientific/technical requirement allows students both to be more extensively involved in their technical interests and to be guided in those areas by professors who are required to keep abreast of changes in their fields. These specialists are, by definition, better able to provide current information in their particular fields than are people who are communications specialists.

In communication areas, the best academic preparation ensures the student the opportunity for experience in all communication media. It is commendable for students to be knowledgeable about writing and editing, but more and more communication is being done through other media. Students need to know how to use these newer means of expression if they are to grow as the communication industry grows. They must be proficient in the use of audio-visuals, television production, computer assisted communication, oral communication, and video tapes. We encourage our students to analyze audiences so they can produce documents which respond to audiences' needs. Frequently the medium of expression which best responds to audience needs is not print. Students need to be able to recognize when alternative media are necessary and to use these media.

One important, sometimes neglected, alternate means of communication is oral communication. Technical communicators must also be excellent oral communicators. Some recent articles have expressed concern that technical writing classes are being taught by people who don't know enough about technical communication to provide a range of necessary experiences, so students give oral presentations to use class time. Actually, oral communication is becoming a more and more important demand upon technical communicators and developing oral skills needs more emphasis. The technical communicator increasingly is

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becoming responsible for the complete production of a document because of increased use of the computer as a production tool and because of an increased focus in industry on having one person see a project through from inception to distribution. Therefore, the communicator more frequently is involved with more people in the process. Involvement with these people requires skills in asking questions, in listening and in presenting information, skills which can be taught only through practice in oral communication.

Although presenting researched and organized information to groups of people continues to be important, supervisors in industry have told me that as much as 70% of a technical communicator's time might be spent in research on a project. Much of that time is consumed by asking questions in interviews, requiring a different kind of oral skill than that required in making the presentation. Academic technical communication programs must include training and practice in various kinds of oral skills, from oral presentations to large audiences to information-gathering interviews with individuals.

The communication experience must also provide for work in graphics, and this experience, too, must continue to become more sophisticated. A few years ago acceptable experience in graphics allowed a writer to be able to talk to graphic artists in the artists' jargon about visual components of a document. Not so now. Our society continues to become more and more visually oriented. One of our highest forms of technology, the computer, has become increasingly the tool of the average person, the person whom we educate primarily through the use of narrative and visual media. The technical communicator must necessarily be able to communicate with all segments of society using this medium of both communication and technology.

And the computer has become more highly sophisticated in graphics presentations. Communicators can create their own graphics at their terminals. They can format documents at their terminals. Therefore, technical communicators must now be able to think visually and simultaneously consider the audiences' response to words; they must be able to create the graphics which complement the words. It's true, technical communicators probably don't need this kind of sophistication in the use of graphics today. But academic technical communication programs do not prepare technical communicators for today. They prepare them for tomorrow, and tomorrow will bring these new demands. Programs must now provide much more experience in graphics and in creating graphics, both in understanding their relationship to texts and in creating them manually and on computer. Technical communicators' control over the success or failure of the documents they produce is growing.

In addition to having increased responsibilities for graphics, technical communicators also are becoming increasingly more responsible for formatting documents. There is no longer a need for a complex system of writing hardcopy, keying it into a word processor, and rekeying it for production. Much of the process now can be accomplished at the writers' own terminals by the writers as they create documents. Therefore, communicators must be much more highly sophisticated in their knowledge of formatting and production than ever before. The need for this new, more sophisticated knowledge also increases the demands upon technical communication programs. Technical communication programs must, therefore, allow students to gain as much experience as possible in all areas of document production. They must know the theory and be able to apply it.

The iteration and production processes are after-the-fact processes. Before the writing begins, planning for creating the document must be completed. The research includes the communicator reading and reviewing existing documents, perhaps taking short courses offered by the industry to help gain additional technical information needed for a new document. As mentioned earlier, much of what is labelled research is oral activity: talking to engineers, talking to reviewers, and perhaps talking to other writers. Much research today, however, also involves using the computer to locate existing documents and even to review them. Electronic workstations, as indicated in discussions of graphics and formatting, are not unique to the computer industry. The programs which recognize that demands upon the technical communicator continue to change, including demanding more skills at using electronic media are those programs which are meeting the needs of students. Experience in computer science, therefore, can no longer be an extra part of a program; nor is it enough for students to know a couple of computer languages. Instead, when students leave the university they must be as proficient in the use of the computer as they are with pens and paper. When they consider research, writing, editing, graphics, formatting, they must be able to think in terms of electronic media and be prepared to use traditional tools only in conjunction with electronic tools.

Skills which facilitate the production of documents and other kinds of presentations are not, however, the only skills the new technical communicator needs. Because of the increasing responsibilities placed upon the writer by new media and new corporate management strategies, the communicator must also be an effective production manager. An effectivce manager must be able to plan the budget for the document or presentation, making choices about costs invovled in the production and decisions about returns on those costs. There are still, certainly, those communicators and those communication situations which require only that the communicator do the research for and draft the document. However, increasingly in all kinds of businesses, there are those situations in which the communicator is responsible for a document from inception to dissemination, and those are the situations for which academic technical communication programs must prepare technical communication students.

The implication of increasing managerial responsibilities for technical communication programs is that the technical communicator must be skilled in economics and other areas of business. Students need courses in economics, accounting, finance, management, and marketing. As well, courses in advertising and related areas help students learn about efficient production designed to attract audiences. Documents are worthless unless they can be and will be read and used by their intended audiences. The new technical communicator, then, must possess both traditional and new, still evolving skills which the new technical communication programs must help their students obtain if the students and the programs are to meet the needs of industry.

The graduates of technical communication programs must be not only speakers, writers, artists, and production people, but people who are all these and more. They must be able to analyze audiences, research information, and decide what media to use to most effectively present the information. They must be skilled enough in each of these areas to think in terms of the various media as they collect information and prepare to present it. New technical communication graduates also must be technicians. They must be skilled enough in a technical area to make intelligent choices about information they are presenting and to check its accuracy, but they must also be media technicians, sometimes just to communicate. They must be psychologists, skilled enough to work effectively one-on-one, in small groups, and in large groups. The communicators of the future must be managers, able to obtain information, to schedule reviews and to make sure documents are reviewed properly and in a timely fashion. They must be able to estimate costs and consider them in the creation of the document. They must be independent enough and skilled enough to handle, to manage, the entire scope of document production.

Academic technical communication programs must, if they are to meet changing demands, offer their students the opportunities to obtain all of the above skills. The most obvious way to do this, naturally, is to offer courses in the appropriate areas: technical and scientific; writing; editing; audio-visual productions; interpersonal, large- and small-group communication; economics, marketing and management; and computer science. But the courses must always be supplemented by practical experience. That means that the students must always be required to produce documents for class which are practical, designed for public use. The students must always be required to take full responsibility for researching, budgeting, writing, and producing documents, selecting and using the appropriate medium for each document or presentation. The highlight of this kind of technical communication program, of course, should be the additional experience and opportunity to synthesize all of the various kinds of coursework gained through internship programs.

To meet the changing demands upon technical communicators, then, academic technical communication programs must educate students for a changing, evolving field of work and prepare them to be effective not only when they graduate but also to meet and adapt to changes which they will face in the future.

ED239287

COMMUNICATION COURSES FOR ENGINEERING STUDENTS

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An investigation into the teaching of communication has shown that engineers, engineering teachers and communication teachers differ on who should teach communication, and on how and when it should be taught. They generally agree on what should be taught. The investigation also showed that engineering teachers differed considerably in their attitude towards technical communication as a discipline.

In general opinion favours group teaching of communication in the senior years. Opinion also favours courses given within the engineering school and under the control of the faculty. The lack of recognition of technical communication as a full academic discipline is a major stumbling block.

1. INTRODUCTION

Unlike most subjects in an engineering curriculum, the position of communication studies is controversial. There is no agreement on who should teach it, how it should be taught, when it should be taught, what should be taught or even whether it should be taught. This paper reports on findings of an investigation (1) undertaken in South Africa and Britain.

2. COMMUNICATION STUDIES AS A DISCIPLINE

A basic problem is that there is no consensus on how communication studies fits into the scheme of university subjects. There have been many debates on whether communication is a 'discipline' an 'academic subject' a 'professional course' or a 'basic skill'. This has lead to vacillation in its treatment at universities. Some universities see communication studies as a direct descendant of rhetoric. Aristotle's definition of rhetoric as the 'study of the means of finding in any given situation the most effective means of persuasion' could, with the addition of 'and sharing information', serve as a definition of communication studies. Britton (2) sets this out clearly. Other writers (3) (4) and (5) also accept this and recognize technical communication as a subdivision of a larger discipline based on rhetoric. Until this view is generally accepted communication studies will be pulled in different directions by its associated disciplines. As long as communication is taught by teachers reaching it from other disciplines these teachers will be torn by divided loyalties.

3. THE NEED FOR COMMUNICATION COURSES

There is evidence in South Africa, Britain and the United States that engineering students are not adequately prepared for the communicative needs of their university course. This is summed up by Kirkman (6) 'Content and method of Schools' English teaching leaves pupils lacking experience of controlled use of language in a variety of inter-personal communication situations .....'

Similarly the need for engineers to communicate effectively and the lack of ability in many graduates have also been emphasized. (7)

In spite of this, many engineering teachers see no real need for communication studies in the engineering curriculum. Less than 20 per cent of those surveyed (8) considered communication as important as other foundation courses. When this is taken in conjunction with the fact that 66% of engineering teachers considered that graduates report writing ability is good or satisfactory, it is not surprising that communication studies is given a low priority in the curriculum. This view is confirmed by Bram's (9) findings in Britain.

'Communication is clearly not considered as a major subject. Indeed it is not even considered as a secondary subject .....' It is thus unfortunate that those in South Africa and Britain who exercise the greatest control over engineering curricula are the least convinced of the need for communication studies. The attitude is often passed on to students and this affects their attitude towards, and motivation for, communication courses. However, while teachers of communication and related subjects may deplore this, the views of the engineering teachers are not without foundation. There has been a long history of bored and resentful students suffering under poorly structured courses, filled with irrelevant material, taught by unenthusiastic and unsympathetic teachers. There is a real need for those planning communication courses to understand engineering rhetoric and the needs of the profession and the students.

4. THE TEACHING OF COMMUNICATION STUDIES

The following aspects of the teaching of communication studies are relevant to the planning of communication courses:

the type of organization required
the teaching method

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the timing of the course
the course content

4.1 The Organization Required

While most practising engineers and engineering teachers agree that the university should provide some form of communication teaching, there is no agreement on how this should fit into the teaching organization. This often results in nothing being done, or faculties and departments vacillating between alternatives. The survey (10) shows that three methods received substantial support.

These were:

an engineering communication studies department	43%
an independent communication studies department	26%
an engineering department with special responsibilities for communication	15%

There was no support for courses taught by a department of English.

It is unfortunate that the choice most favoured is the least practical in the South African and British systems. The time and resources allocated to communication are usually insufficient to support a viable department. In America accreditation requirements provide a reasonable base load for a department of humanities within an engineering school.

The teaching of communication studies within an engineering department has a fundamental weakness. The teaching is usually entrusted to staff to whom communication is a secondary interest. Communication teaching is thus dependent on the enthusiasm and abilities of teachers appointed for other interests.

4.2 Teaching Methods

Teaching methods at institutions are determined both by what is academically desirable and what is economically feasible. There is consensus that group teaching is more effective over a wide range of subjects; it is not surprising therefore that the consensus among communication teachers favours group teaching. However, in the interests of economy it is necessary to consider the effectiveness and feasibility of lectures for at least part of the course. Views expressed, for example by Kirkman (6), confirm that lectures have extremely limited value and that a substantial proportion of group teaching is essential.

We operate with groups of up to twenty and our experience shows that an upper limit of sixteen is preferable. We have also found that for certain activities even smaller groups are desirable; the main limitation being the marking load of staff. Thus any plan for a communication course should provide staff and support for a substantial amount of group teaching.

4.3 The Timing of the Course

There is no real solution to the problem of the best time to give a communication course. There is no single 'best time'. Kapp (11) gets to the nub of the problem when he states 'Many of the problems (of communication) are,... too advanced for the school curriculum. Many of them can only be appreciated by the mature mind of the post-graduate.' Ideally the student should learn only those skills that he can apply immediately. This would entail receiving appropriate instruction at school, through university and into post-graduate life.

In our courses we have two teaching objectives:

(a) to prepare students for the communicative needs of their university curriculum

(b) to prepare students for the communicative needs of their future profession

The first should ideally be achieved early in a student's curriculum and the latter in the final year. Britton (12) Sawyer (13) and Wilcox (14) have pointed the problems of teaching technical communication in the early years and the desirability of teaching it in the senior years. Where the timing of a course is set by non-academic criteria it is important to tailor the course aims to the stage of development of the students.

4.4 Curriculum Content

There are some people who consider that engineering students as a group have poor communicative skills and therefore require remedial teaching. This is only true to the extent that the school curriculum is designed to prepare students for literature rather than functional English. Thus to treat engineering students as a sub-standard group is to court failure. Many courses have failed because of the accumulated resentment and frustration of intelligent students.

There is a general consensus that the content should be relevant to students and, as far as practicable, be seen to be so. A study of the content of courses for engineering students at fourteen British tertiary education institutions indicated that certain topics occurred frequently. The topics in order of frequency are listed in Table 1.

TABLE 1

FREQUENCY OF OCCURRENCES OF TOPICS IN FOURTEEN BRITISH COMMUNICATION STUDIES COURSES

TOPICS	FREQUENCY
Oral presentation	12
Group communication	11
Report writing	10
Communication theory	9
Graphic communication, information, science	8
Use of language, interviewing, letter writing, article writing	6
Study skills, text evaluation, communication in organizations	4
Instruction writing, essay writing, text writing. laboratory reports, precis writing, remedial English, semiotics, engineering drawing, mass media	3 or fewer

This table shows the practical orientation of courses. Oral communication and communication theory are highly rated. There is considerable emphasis on the need to understand the communication process. Brookes (15) lists three basic topic areas that should be covered.

- the general communication process
- linguistic communication and criticism
- the forms and conventions of scientific discourse

The survey among professional engineers, engineering teachers and recent graduates gave a slightly different order of priorities. These are shown in Table 2.

TABLE 2

RANK ORDER OF IMPORTANCE OF TOPICS IN THE UNIVERSITY OF WITWATERSRAND COURSE GIVEN BY VARIOUS GROUPS

	Overall	Recent Grads	Teachers	Corporate Members
Report Writing	1	1	1	2
Letter Writing	2	3	2	1
Group Comm.	3	2	4	4
Text Writing	4	5	7	3
Graphical comm.	5	7	5	5
Essay Writing	6	4	3	6
Comm. Theory	7	6	8	7
Speech making	8	8	6	8

There is general agreement among the groups on content. There are, however, significant points of difference. Recent graduates and professional engineers give greater weight to communication theory than engineering teachers. The high ranking of correspondence, particularly by professional engineers, contrasts with its low priority in Table 1. Speech presentation is ranked low in contrast to its position in Table 1. It seems therefore that group communication should be the preferred vehicle for oral communication. There are, however, many communication teachers who consider that speech presentation is good, both as a discipline and for building student confidence.

5. CONCLUSION

There is no sure recipe for a successful course. A dedicated, enthusiastic teacher can succeed with an unlikely course while an indifferent teacher can spoil the most meticulously planned course. Accepting these limitations it is possible to set out criteria for a communication studies course for engineers, which will stand a reasonable chance of success. The following are important points for people planning communication studies courses for engineering students.

- Recognize that technical communication is part of the wider discipline of communication studies.
- Recognize that engineering communication is not a variation of English composition but is a rhetoric that has its own special situations, modes, media and strategies.
- Accept that many teachers have no basic training in the rhetoric of engineering. Such teachers should make a special study of the rhetoric and become aware of the problems of engineering communication.
- Recognize that communication is not a subject that can be taught effectively by lecturing to large groups.
- Accept that group teaching with adequate provision for written and oral assignments is essential.
- Recognize that the students stage of development will determine the skills that can be taught effectively. Those skills needed in the immediate post-graduate years are best taught in the senior years.
- Recognize that course content should be relevant to needs and should be seen to be so.
- Recognize that the co-operation of the engineering faculty is essential. Equally the engineering faculty should recognize that their involvement is important and desirable.

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ED239264

EMPHASIZING PROFESSIONALISM:
APPROACHES IN BUSINESS AND TECHNICAL WRITING

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A good technical writer or accountant communicates. He does this in a variety of ways ranging from oral to written reports. Without these skills, he will never succeed. Thus the task of the technical writing teacher is important: teach the need for communication skills. This is a difficult task as many undergraduates are not convinced that such skills are important outside the classroom. Dissatisfied with most textbook exercises, we cooperatively developed a class project to introduce our students to the actual environment in which professional communication takes place. These papers describe the procedures and exercises we use and explain their applicability to several different academic disciplines.

Once a student has finished his course of study and has advanced into the world of business or other professional fields, he usually discovers that much of his time is taken up in communicating his ideas to others. This might be done through written reports, letters to those outside his own field, memos, oral presentations, interviews or written summations of conferences or meetings. Without the skills necessary to complete these activities, the student's work will all be for naught. One of the major differences between the professional and the beginner, then, is the variety of communication skills which the professional regularly employs.

The student needs to develop these communication skills if he is ever to find success in his chosen field. It is often a losing battle, however, to convince undergraduates of this need. Brainwashed by years of TV watching and bombarded by modern advertising techniques, many students are convinced that each of them will be assigned a secretary who will not only assemble all the information needed, but also write it up in a presentable form. Disabusing students of this illusion and convincing them of the importance of acquiring communication skills of their own is often one of the most frustrating challenges faced by the writing teacher.

The difficulty of this task is compounded by the fact that many students feel that the writing teacher is merely trying to fill his own classes or to magnify his own importance by stressing the necessity of developing good communication skills. In addition, in the classroom situation, many of the assignments to be found in current textbooks seem terribly contrived and artificial; their principal aim seems to be to generate paper and/or to require busywork.

After several years of experimentation and discussion, Professor Anita Leininger and I have cooperatively developed a class project designed to introduce our students to the actual environment in which professional-level communication takes place, put them in close contact with an expert who must exercise communication skills and finally require them to put these skills into actual practice. Because we represent two different areas of the field of communications (business writing and technical writing for ag majors) we mutually adapted our project to the needs of our two disciplines. This, we believe, is one of its major advantages since it can be used for the specific needs of the individual instructor.

In the case of the business writing course which I teach at Michigan Technological University, the students are asked early on what they believe to be the major communication problems faced by business people in their everyday routines. The responses are listed and then compared with actual instances submitted by local businessmen. The discussion in class then focuses on the best solutions to these difficulties and the easiest ways of approaching them. One of the best methods of getting the students started on this phase of the project is to give them copies of actual letters received by local businesses and to ask them to write appropriate responses. Comparing the resultant letters with those actually sent by the companies also serves to make the students more aware of the important role which communication plays in the business world.

Once this has been accomplished, the rest of the assignment is explained. Each student must choose a firm in the area which hires

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graduates in his major field. The accountants are encouraged to seek out an accounting firm, the management majors, a management firm, etc. They are discouraged from selecting anyone within the academic community or a place of business where they might work after school hours. It is better that they move out of familiar areas and become acquainted with more aspects of the communication process.

When the initial contacts are made, the students are expected to arrange with a member of the firm for an interview during which the place and importance of communication skills in that business will be discussed. In this way, the students will not only be hearing about the importance of communication from someone actually at work in their fields, but they will also be developing their own skills through practice in interviewing--one of the areas they will be expected to be proficient in later in their careers. Indeed, since one of the most important parts of their job searches is the formal interview, this step is prepared for in great detail.

While the appointments are being arranged, the techniques of successful interviewing are thoroughly covered through the material in the textbook and actual classroom examples. Since focus and planning are of such great importance and since the time with the local business people will be somewhat limited, these points are stressed. The students are asked to narrow their focus to two basic topics: (1) the place business communications has in that particular firm and other firms of its type and (2) the duties, assignments, or skills the student in that field should strive to achieve in college so that he will be more fully prepared when he enters the job market.

To assist the students further, the more practical aspects of interviewing are demonstrated in class through mock interviews between the instructor and selected students and later between the students themselves. Several of these are video-taped and critiqued in detail to explain the best approaches and to underscore the weak points. As a further aid, the students are given instruction on the techniques of questionnaire writing and then asked to submit a sample survey form which they will actually use at the interview itself. Again, these are critiqued in detail to explain all of the advantages and disadvantages of the various methods. Samples of selected questionnaires are put on the overhead projector so that everyone has a chance to judge their effectiveness. Finally, some members of the class are asked to use their questionnaires during the mock interviews to see if they facilitate the gathering of information and to serve to keep the conversation focused and flowing.

A last bit of instruction is given in the area of note taking during an interview as well as some explanation of the advantages of taping the conference for purposes of processing the information and making the eventual job of writing it up in a readable form that much easier. These skills, which we automatically assume students to have developed during their education process, are often overlooked both in the textbooks and in class.

With all of this preparation behind them, the students then begin their interviews of area business people. During these interviews, they are encouraged to ask for any company brochures or in-house publications which might offer information about that organization. They are also told to ask for copies of memos, reports or bulletins which are issued to employees. The old cliche still holds true: "a picture is worth a thousand words," and having the students actually see the communication process at work in a company is worth more than all of the lectures or readings which we can give them.

Since an integral part of the communication process is to synthesize information gathered from various sources, and since many business reports today are based on interviews or discussion groups, the last part of this project is for the students to transcribe the information gathered during their conferences and to write a coherent report such as they might have to submit in an actual job situation. This sharpens their skills in paraphrasing and summarizing and also emphasizes the importance of quoting accurately since they are required to include some direct quotes from the interview. To help prepare them for this, the chapters in the textbook dealing with transcribing and editing are covered at this time and several short exercises are assigned. At the conclusion of their reports, the students are asked to summarize what they learned about communication in their fields and to give their view of how important writing and speaking skills are in most professional jobs.

The results of this class project have been quite positive. Since its primary aim is to demonstrate to the students the importance of communications skills in the professional fields they have chosen to enter, it is the conclusions in that area which were most significant. By the time most students have finished reporting the results of their interviews, they admit to being surprised at how much time business people spend in communicating with others and how many varieties of communicative skills are needed. In addition to convincing them of this, the exercise also trains them in designing workable questionnaires and gives them practice in interviewing techniques.

The response from the local business community has also been favorable as it gives them a chance to meet and to evaluate some prospective employees. In a letter written after the conclusion of the exercise, one town businessman remarked: "In the young man sitting across from me, I saw myself at an earlier date: nervous, hesitant and unsure. I only wish that I had been given this kind of opportunity to find out a little of what lay ahead of me."

EMPHASIZING PROFESSIONALISM: APPROACHES IN BUSINESS AND TECHNICAL WRITING

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With a few variations, this project works equally well in the agricultural communications (Technical Writing) classroom. Because technical writing is a required course at University of Nebraska-Lincoln for all agricultural students, it is usually necessary to convince incoming students of the usefulness of a writing class--technical or any other kind. One assignment that often helps to convince them that they will not be able to put away both book and pen--especially pen (word machine-typewriter-etc.)--on graduation day is what I call the Interview Assignment.

For this assignment all the students in a class are asked to begin by listing several kinds of positions they will be prepared for by their college academic major upon graduation. Then they are asked to choose one of these positions and to list 2-3 people who hold such positions--preferably someone with at least 3-5 years experience. Next, they are asked to arrange for an interview with one of the people on their list. The purpose of the interview is to demonstrate to the student how important writing will be in their chosen profession. They also learn what kinds of writing they will be required to do once they start working.

During one class period, the following interviewing techniques are discussed:

(1) Make an appointment for the interview.

Some reasons for making an appointment usually include (a) making sure the person to be interviewed is in his office (place of business) when the student arrives, (b) making sure the interviewee will be free to spend time with the student without feeling rushed, (c) making the student think about the interview ahead of time (thus mentally preparing himself).

(2) Prepare a list of questions to ask during the interview.

One questioning technique that is discussed in class is how to write questions that encourage further discussion instead of cutting it off because the question can be answered with a flat yes or no.

It is stressed that there are several advantages to be gained by making a list of questions ahead of time, such as (a) keeping the conversation on the subject so that most of the time isn't used up by chit-chat. When at the last minute it becomes necessary to rush, the student may not remember the important questions, or if he remembers to ask them, he may miss some of the answers, or even worse, he/she may remember and report the answers inaccurately. (b) Preventing loss of time getting the interview started because the student really hasn't thought about what he'd like to know. (c) Saving time for both interviewer (student) and interviewee.

After the in-class discussion about preparing for the interview, the student is given a printed assignment sheet and an evaluation sheet for the report of the interview that the student will write.

The next step is for the student to do the interview. I recommend that students listen carefully during an interview and then sit down immediately afterwards and make notes on the interview, as it is sometimes disconcerting for the interviewee to see someone busily trying to take down what he is saying. (However, in reading the papers for this assignment this semester, it appeared that many of the students had filled in the answers to their prepared questions during the interview.)

The students are asked to obtain at least one example of writing that the interviewee does in carrying out his job. (Many students include several examples.)

After the interview, the student prepares a short report of 1-2 pages, telling what he learned. (If a student happens to choose someone to interview who spends less than 10 percent of his job time writing, the student must choose someone else on his list of names and arrange for another interview. (However, this rarely happens.)

The report is evaluated according to how well it is organized, how well it is written, and whether or not it contains the requisite information.

The final step is to turn in the assignment. This includes a (1) list of possible interviewees, (2) list of questions, (3) rough draft and final draft of report, (4) example(s) of writing obtained from interviewee, (5) evaluation sheet.

This written discussion of this assignment makes it seem like a much more involved assignment than I feel it is. After one good in-class discussion, the students are on their own. Probably the biggest hassle for the student is choosing someone to interview, the second, writing the report.

This assignment is probably fairly easy to write, as eventually the student is writing about information contained in his own head, so he is able to just write. (Ha) Well, that's the way it seems to the instructor.

The greatest value of the assignment occurs when the students begin to realize just how much of their on-the-job time a county extension agent or an animal science professor spends doing some form of writing. The student, who has blithely been assuming his future secretary will do his writing, is suddenly made aware of the fact that someone else has to do the writing first--the secretary only does the typing. That's not to say all of the students immediately become enamored of writing and strive to produce masterpieces. More than likely they will at least see the value of doing all the assignments fairly well with only a minimum of grumbling under their breath--or occasionally they drop the class and either shop around for an instructor who, they hope, will require less writing, or they change their major to one which doesn't require technical writing.

Students receive several other benefits from this assignment: (1) They learn how difficult it is to develop even a short questionnaire that contains clear, unambiguous questions. (2) They gain experience in arranging and conducting a business meeting (interview). (3) They receive practice both in transcription and editing.

This communications project has proved to be an excellent assignment, since it not only serves to get the students out into the professional community, it also reinforces the importance of effective communication in the world of work through contact with professionals already on the job.

ED239288

MEDICINE AND THE MEDIA: A COURSE IN COMMUNICATION SKILLS FOR CLINICIAN-EXECUTIVES

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Abstract

A course entitled "Medicine and the Media" has been developed by the Administrative Medicine Program of the University of Wisconsin-Madison. This is a graduate program for clinician-executives and health care professionals who may assume administrative responsibilities. The course was designed to help students: understand the respective roles and demands of both the medical profession and the media--how they interact, are similar, and differ; learn the theories and techniques of oral and written communication for professional and consumer groups; and develop confidence and skill in presenting their individual and organizational messages by means of diverse media.

Introduction

During their professional training most health care professionals do not have time to take courses in communication skills, yet much of their time after graduation is spent communicating with their patients, other staff members, and the public. Many must present formal classroom lectures, discuss health care policies with legislators, deal with health care planners, or describe medical problems on radio and television shows. Often they will be asked to explain in writing the results of their research, the recommended treatment for their patients, their plans for a new hospital, their needs for a sophisticated technological innovation, or a proposal for a research project. It is essential that they have excellent speaking and writing skills in addition to their medical expertise in order to be successful in their profession.

Frequently a health care professional will be asked or required to assume administrative responsibilities. Here they find that skill in communicating with others is even more essential. In addition to their personal need for excellent communication skills, they must also be able to present their institution's or department's image clearly and effectively to the public as well as to other professionals. This may involve sensitive or controversial matters. They may also be asked to serve on editorial boards where they will be charged with evaluating the written work of their peers. Possibly they may desire to write a textbook or become an editor of a professional journal. Certainly they must be able to advise and critique the material written by their staff.

Meeting the Challenge

To meet the increasing demands of the health care profession for clinician leadership, the University of Wisconsin-Madison developed the Administrative Medicine Program. It is an innovative, graduate level academic program designed to train the leaders our society needs to perform administrative and managerial functions of health care.

The curriculum is multi-disciplinary, encompassing the fields of accounting, business, clinical administration, economics, industrial engineering, law, medical education, medicine, nursing, political science, and preventive medicine. It has been carefully designed to complement the training of health care professionals who have at the minimum completed their medical specialty training for direct patient care and foresee that they also need knowledge and skill in the broader aspects of health care leadership. It is also valuable for those who are already serving in an administrative position and wish to develop more skill and greater understanding of certian aspects of health care administration leadership.

These students learn the intricacies of delivering highly skilled, scientifically sound, and technologically sophisticated medical treatment within the political, legal, and societal demands imposed on such services.

Medicine and the Media

To help the students develop the communication skills they will need and an understanding of the different media with

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which they will have to deal, a course entitled "Medicine and the Media" was developed.

The principal instructor was Dr. Jeffrey Kunz. He is a physician whose main interest has been in medical journalism. He was the first Morris Fishbein Medical Journalism Fellow. This enabled him to work at American Medical News, the British Medical Journal, the Journal of the American Medical Association, the Lancet, and the New England Journal of Medicine. Until this year he was Senior Editor of the Journal of the American Medical Association and Editor-in-Chief of the AMA Family Health Guide, an 800 page consumer health book.

The other instructor, Dr. Buchanan-Davidson, was a research scientist who had published numerous technical articles in professional journals, abstracted scientific articles for Chemical Abstracts, prepared a monthly column for a state medical journal, and written news releases, newsletters, brochures, and feature stories for professional and lay audiences.

They were assisted by a faculty member of the University of Wisconsin School of Journalism and by an author's editor, who gave additional breadth and depth to the discussions.

The students were all practicing health care professionals who had demonstrated leadership ability in some part of the health care system--doctors, nurses, physical therapists, medical technologists. Several were already in responsible administrative positions such as medical director of a hospital, head of a department, and administrator of a large medical clinic. Their experiences in publishing medical information, lecturing, dealing with news reporters and legislators, and advising students and staff permitted thoughtful questions and discussions.

Objectives

The objectives of the course were to help the students: 1) understand the respective roles and demands of both the medical profession and the media, how they interact, how they are similar, and how they differ; 2) learn the theories and techniques of oral and written communication for professional and consumer groups; and 3) gain confidence and skill through practice in presenting both their individual and organizational messages by means of diverse media.

Experience in Oral Communication

The course was specifically designed to help the students improve their skills in oral communication by presenting technical medical and sensitive health policy materials to patient, consumer, and professional audiences. To give them experience in talking to a live audience using a microphone and working under lights in front of a camera, they were asked to deliver a short speech that was video-taped. Since this was the first class session, the text of their speeches had been prepared for them. After a short introduction stressing some of the basic principles of giving such presentations, they delivered their speeches which described a point which needed to be stressed about the technique of public speaking. The video-tapes were then replayed so the students could critique their own presentations.

As a final class project to give the students experience in both writing and public speaking, they were asked to prepare a 90 second speech on a topic related to their special field of interest. Their presentation in front of the class was video-taped. Members of the class served as a critical audience to give the presenter experience in persuading, defending, and clarifying his position. The video-tapes were replayed for class discussion and evaluation by the faculty.

The informal nature of the class permitted the students to ask questions, and discuss areas of concern to them in their work with the instructors.

Understanding the Publishing and Printing Process

Because the students were practicing health care professionals, the course was designed to give them an overall appreciation of the publishing and printing process. It was assumed that they already had well developed writing skills.

The preparation of a technical article was described so that they would be able to help members of their staff meet the specialized requirements of publishers. The process of peer review and the duties of referees and editors were described. Some of the needs and problems encountered during the time from submission of a manuscript to final publication were explained.

Information was also presented on other types of writing frequently required by health care professionals, such as patient education materials, lay publications, brochures, newsletters, news releases, and grant proposals. Suggestions were given on how to prepare the manuscripts, query the publishers, and submit the finished materials for publication.

Understanding the Media

Special attention was given to helping the students develop an appreciation and understanding of the process of media reporting. The specific needs and constraints of different types of media--newspapers, radio, and television--were discussed. Suggestions were made on how to tailor highly technical or sensitive medical information so that it would be clearly and accurately reported. The students were also advised on ways to develop skill in persuading, defending, and clarifing one's position, especially when the subject may be controversial or the audience hostile.

Visual Aids to Effective Communication

Because visual methods of presenting medical information are especially useful techniques for communicating difficult technical material, special help was given on the preparation of slides, tables, graphs, charts, and other visual aids.

Business and Legal Aspects of Communication

Not only must an administrator be able to express himself clearly and effectively when speaking or writing, he must also understand various financial and legal concerns related to the publishing process. A thorough knowledge of copyright laws, liability, informed consent, and defamation is a necessity. If one desires to publish a book or produce a major film or tape presentation, details of contracts must also be understood. We attempted to give a firm grounding of the legal issues that affect medicine and the media.

Teaching Aids

Throughout the class, use was made of video-tapes, slides, overhead projections, and handouts to illustrate the material. Also as an aid to the students, a list of resources was compiled for use during the course and for reference to answer questions which may arise in their future work. This was divided into three major divisions.

The first unit was entitled: "The Clinician-Executive as a Speaker." This included references to articles and books on the oral presentation of technical material in a manner appropriate for specific audiences, such as radio and television. It also listed information about how to handle difficult or sensitive questions. In addition information was included on how to dictate letters, chair a meeting, or prepare minutes of a meeting.

The second unit was entitled: "The Clinician-Executive as a Writer." This included references to material on understanding the audience, the type of communication best suited to meet the need, how to edit a manuscript, proofreading and the printing process. References were included to direct the student in how to prepare a technical article, decide on the appropriate journal, develop the parts of the article for effective presentation of technical information, and review or referee a professional article. Other references detailed what is involved in writing a book, how to contact a publisher, as well as points to consider when signing a contract. Information was also provided on the preparation of newsletters, brochures, feature stories, news releases, and grant proposals.

Although skill in writing was not stressed in the course due to time constraints and the special needs of the students, detailed references were provided in the third section on writing style, word usage, and grammar. Information was also provided on the preparation and use of visual materials, such as photos, pictures, slides, tables, and graphs.

Evaluations

Student expectations for the course were obtained by means of a brief questionnaire which was completed during the first class session. This enabled the instructors to tailor the course to meet the desires and needs of the students.

At the end of the course the students were asked to complete an anonymous questionnaire critiquing the course content and presentations. These were used to revise the course for the next session.

The students were evaluated by means of the unrehearsed video-tape recording made during the first session and the 90 second speech they wrote and presented to the class during the final session.

Each student was also asked to submit a written project. Some submitted a manuscript which they hoped to submit to a professional journal for publication. Several developed patient education materials for their hospital or clinic. Another prepared a grant proposal for a projected departmental project. One described plans for educational materials for training of emergency medical personnel. These were carefully edited and suggestions made for improvement and future publication.

Conclusion

The course, "Medicine and the Media," should help clinician-executives and health care professionals planning a career in health care administration understand the media and communicate highly technical and often sensitive information to different audiences in a clear and effective manner. An understanding of the theory and techniques of oral and written communication is essential to develop the skill and confidence required to present individual and organizational messages. Similar courses for administrators in other specialized areas would also encourage mutual understanding and cooperation with the media, as well as help these leaders develop the necessary skills for effective oral and written communication.

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TEACHING THE TECHNOLOGY OF TECHNICAL COMMUNICATION TRANSFER

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In an urban area of expanding industry, the English Department of Southern University in New Orleans designed a program to meet the urgent need for the transfer of technical and professional communication to students of divergent disciplines for a community of a wide variety of employment needs. The techniques chosen were those used in the transfer of technology combined with the process of technical communication itself. The result has been individualized training and varied hands-on experience in the techniques of technical communication.

INTRODUCTION

In an urban university in a world of growing and changing uses of technology, there is an urgent need for the transfer of the technology of technical and professional communication to the students. The increasing uses of new technologies in the operation of business and industry make it imperative to increase the uses of communication. A university preparing its students to take advantage of the opportunities for careers in such a technically developing world must also prepare its students to develop the technology of communication necessary for their success and for the success of business and industrial operations. This necessity is especially great in an area of expanding business and industry such as New Orleans, where such an urban university, Southern University in New Orleans, is located. The English Department at SUNO became aware of the increasing need to teach its students the techniques of technical communication and began the task of designing a program to meet this felt need. After a study of various techniques, it became apparent that the best techniques of teaching technical communication are those used in the transfer of technology and in the process of technical communication itself. By combining the techniques of technology transfer and the process of technical communication, a process for the transfer of the techniques of technical communication can be developed. This process would include:

1. Definition of the problem.
2. Analysis of the task.
3. Analysis of the audience.
4. Statement of purpose and listing of objectives.
5. Strategic program design.

DEFINITION OF THE PROBLEM

The process of designing a program for teachint the skills of technical and professional communication should begin with a definition of the problem. Since the employment needs of the community create a demand for specialists in certain areas, that demand must be considered in preparing students to meet the communication needs in those areas. While the needs of the national community are always to be considered--the changing needs of business and industry that are becoming more technical and computer oriented--the particular needs of the surrounding urban community should be given special consideration. New Orleans is a growing center for oil and chemical production, aerospace, prospective new high technology industries, and corporate headquarters, while the city continues to be a shipping, tourist, and medical center. An urban university serving such an area and developing new programs to meet its needs must design a technical and professional communication program for students from different disciplines to prepare them for a wide variety of careers. Such a program should be based on general technical writing principles with specific training adapted to widely divergent disciplines.

ANALYSIS OF THE TASK

An analysis of the factors involved in the problem logically leads to the actions included in the task. Overall, the task of transferring technical communication to multidisciplinary students is one of teaching basic principles of technical communication and demonstrating how those principles may be adapted to different disciplines. An analysis of the student audience should be made to determine the individual backgrounds, preparation, and disciplines in order to tailor the course to the students and their career fields.

ANALYSIS OF THE AUDIENCE

The audience is made up of the primary audience of students, to whom the knowledge and skills are to be transferred, and the secondary audience of the educational institution and the community. The primary audience at SUNO consists of students from such diverse

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areas as computer science, technology, business, the sciences, nursing, the social sciences, education, English, journalism, and even the staff of secretaries and clerks.

An analysis of the skills of the student audience reveals an equally diverse background of writing skills already acquired and skills needed. Fundamental among the skills needed are the ability to write clearly, coherently, concisely, correctly, and effectively. The skills already acquired are mixed. After students have completed the requirement of Advanced Grammar/Composition, some have the ability to write an essay with reasonable effectiveness and absence of major errors, yet have little technical knowledge, while others have technical knowledge but an inability to write clearly and effectively and still have problems in the basic skills. Few have any familiarity with the requirements and forms of technical and professional communication. Students must have knowledge of the basic skills of organization and grammar. But beyond these skills, technical communication demands competency in the complex skills of the writing process: the ability to analyze a problem, state the problem, and suggest a solution; the ability to state the purpose and suit the form to the purpose and the audience; and the ability to choose the proper communication format. Regardless of the wide divergence in abilities and career goals of the students, all have the common need and goal of acquiring these communication skills.

STATEMENT OF PURPOSE AND OBJECTIVES

The purpose of a program in technical and professional communication for multi-disciplinary students is to transfer the techniques of communication in general and adapt them to various career fields in particular.

Instructional objectives should include:

1. To transfer the general principles of communication.
2. To review and polish the process of writing.
3. To reinforce the basic skills of grammar and mechanics.
4. To familiarize students with the principles, structures, and formats of technical and professional communication.
5. To introduce students to the uses of the media in technical communication.
6. To provide opportunities for students to polish their skills in oral communication.
7. To give students practical experience in the application of the general principles of technical communication to their particular fields.

STRATEGIC PROGRAM DESIGN

Consideration of the needs of the primary audience of students and the secondary audience of the institution and the community, together with the factors involved in the techniques of technical communication, led to the conclusion that there should be two courses in technical communication:

- An introductory course in the fundamentals of technical communication.
- An advanced course in the application of the fundamentals to particular fields.

The introductory course should include the fundamental principles of writing, practice in the process of writing, the basic skills of grammar, strategies of technical communication, introduction to the formats of technical and professional communication, practical application of the formats to the particular fields of individual students, and polishing the skills of oral communication. Within the conventional outline of the course, emphasis should be put upon having students to adapt their communications to simulated situations in their chosen fields or, as in the case of employed students, situations on the job. After students learn the basic strategies involved in the process of writing, their ideas for simulated on-the-job situations can form the basis for discussions with their peers that will help them to polish their oral communication skills. The course should begin with each student introducing himself or herself with a summary of his or her career plans. From that point, discussions of job situations can continue to the culminating activity of an oral summary of the written formal report. Often that oral presentation stimulates a lively session of questions and answers. Thus the very divergence of disciplines of the students can become the means of generating ideas and polishing the skills or oral communication.

Since such a large proportion of the introductory course must be devoted to the fundamentals of the process of writing and the basic skills of grammar, there is a need for an advanced course devoted to concentrated study and practice in the more complex and techni- forms of communication. Such a course would also be adapted to the various career fields of the students. Emphasis should be put on problem solving and management, using the most effective technical formats, and visual aids, including especially technical reporting and proposal writing. To give students the benefit of practical experience, actual examples of career communication may be requested from community businesses, professions and industries. Members of the area chapter of the Society for Technical Communication have volunteered to contribute nonsensitive samples to this course. It would also be helpful to have volunteers from area businesses and industries to share their experiences with the students. Also, members of the STC have volunteered to help give students at SUNO a sense of the realities of on-the-job experiences in business, professional, and technical communication. Culminating activities should be the written and oral presentation of the students' own concepts of longer forms of technical and professional communication for simulated on-the-job purposes.

CONCLUSIONS

At SUNO, the introductory course in Technical and Professional Writing, with its concentration on all career fields, has proven successful and demand for it is growing. That demand has led to the recognition of the need for a course in Advanced Technical and Professional Communication. That demand for technical communication is part of the growing demand in a world of rapidly expanding communication in all its forms. No longer is technical communication limited to applied technology. The term "technical communication" has come to mean "career communication," and the ability to use written and oral communication successfully has become necessary to ensure successful careers. English and journalism students will find technical communication to be a new professional career for them, while students in all other fields will find it to be an integral part of their careers. The transfer of the techniques of technical communication has become a necessity for the primary student audience and for the secondary audience of the educational institution and the community.

IF I DON'T KNOW YOU, HOW CAN I TEACH YOU?

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It was noted at the 24th International Technical Communication Conference in 1977 and again at the 25th and 28th ITCC's that few English teachers have had any vocational experience with business, industry, management, or government, and that the teachers of technical writing tend to have Ph.D.'s in English literature with little or no training in the teaching of writing in any form. How, then, is the teacher to gain the knowledge to function capably in the classroom? Is it enough for the teacher to rely on textbooks written by peers who may or may not be any more qualified than they? This author says not. He advocates either leaving the "hallowed halls of ivy" to gain first-hand experience as a technical communicator or else bringing the experience into the classroom in one of several forms. This discussion does not claim to be an exhaustive listing of do's and don't's for teachers of technical writing, but is rather intended to stimulate the teacher to review his qualifications and correct shortcomings so that he will not be the one to say: If I don't know, how can I teach you?

How many of us have degrees in technical writing? For that matter, how many of us have ever taken courses in technical writing or even composition courses beyond the level of freshman English? And, how many of us have ever taken a course on the teaching of writing? Then how in the world can we expect to teach technical writing?

This is the question I want to address here: If I don't know, how can I teach you? If I have never taken the course work, how can I be knowledgeable enough to expect to teach the material to you? And, if the course work is not available, how in the world can I expect to gain the knowledge to teach you? Experience!

Yes, experience. I know of no other way to learn something than through experience. Most of the working technical writers and editors today have no degree in technical writing, and those with degrees in English are in the minority. Quite a few of us have never even taken a course in writing beyond freshman English, and a fair share of our number have never been to college. Isn't it a marvel then that we are able to present our messages (at least part of the time) with some reasonable degree of organization and clarity? Certainly not. What we lack in education we gained through experience. Teachers of writing can gain their knowledge in exactly the same way.

If you don't know, you obviously can't speak with authority on the subject, can you? No. At the 24th International Technical Communication Conference in 1977, Dr. Albert Brouse of the Illinois Institute of Technology reported: "The professors of English who teach writing in our colleges have had little or no training in the teaching of writing. They have Ph.D.'s in English literature. This was the conclusion of English department chairmen in a conference sponsored by the Carnegie Corporation."[1] At the 25th International Technical Communication Conference the next year, Dr. Robert Tippitts, Director of Writing Programs for Shipley Associates Training Programs, related his own experience: "I have not found true the idea that all or even most college or university teachers of technical writing can be successful teaching business, government, or industry groups."[2]

What can you do about it? Get out and learn. The professor who taught me technical writing at Iowa State had earned his degree and then settled into teaching for 27 years without ever leaving the campus. He was dependent upon what knowledge he gleaned from supposedly authoritative texts to deliver his message to his students. It appears this is not unusual. Tippitts commented, "Too many college writing teachers are textbook dependent. They have little or no actual industry, business, or government writing experience, so the examples in the books or those generated by students are the only ones available."[3]

As I learned when I graduated and wound up quite by accident in the practice of technical writing, much of my professor's information was faulty and out of date. He was teaching what he thought was being done as standard practice out in the cold, cruel world. How many of you do the same thing? Are you able to speak with authority or are you like the college types Dr. Tippitts describes who "talk, talk, talk and fill college English classrooms with [their] profundity."[4]

How many of you have ever worked in any kind of industrial communications organization for so much as even one summer? Dr. Brouse noted that few had. Most were expected to teach writing by virtue of having been trained in English literature.[5] If you are one of those who has worked in industry or government, you are sure to have learned something about technical communication, even if it is only that the company hired you more as a courtesy or out of a sense of public duty than because they expected you to produce much of anything useful in so short a period as one summer. Some of you, I feel sure, have made a conscientious effort to get out and discover what is going on today in technical communication. Some of you may have, as Robert DiGiovanni suggested at the 28th ITCC,[6] done some freelancing or have taken part-time jobs in industry or with government as a means of not only gaining knowledge and experience, but also augmenting your income. You I applaud. For those of you who have not, I would like to briefly summarize the results of a survey taken and reported by the Society for Technical Communication.[7]

This survey was taken among practicing technical communicators. When asked what they thought should be taught in communication courses, these people responded that both methods and theory should be taught in about equal amounts, but that instruction in methods is more important than instruction in theory.

Of course, I know that it is not always possible for a teacher to gain first-hand experience, for whatever reason. What can we do then? Simple. If Mohammed is unable (or unwilling) to move, we have to try to find a mountain that is willing to do the moving. If you are unable to leave the campus or forsake the classroom to gain experience, invite the experienced communicator to come into your classroom to teach with you, either in the form of guest lecturer or as grader, critic, or commentator on one or more assignments each term. After all, as Dr. Thomas Pearsall commented, "the more you can demonstrate to your students that writing is part of the everyday experience of the technical person, the more you will strengthen their desire to develop writing skills."[8]

What could be better than to have the supervisor of a proposal writing group come into your classroom to discuss his specialty? Or have a manuals editor discuss the teamwork necessary to produce the text and illustrations for large documents? Surely most schools are close enough to a company having technical communicators to permit such a relationship to develop.

Now, the idea of having experienced communicators serve as graders, critics, or commentators may be a bit tricky to administer and may not be worth the effort. I have never tried it and I don't know anyone who has. But why not try it? If you are close enough to an STC chapter or a major concentration of technical communicators, why not try to get some expert commentary from them on not only what your students write, but also on what kinds of assignments you give them. Are you sure the things you are asking for are realistic? Do they represent real-world situations analagous to those the new graduate is likely to encounter on the job? Why not offer yourself and your course outline to that STC chapter as a monthly meeting program? Let them criticize. Let them offer suggestions for improvement.

If all else fails, why not try entering student papers in technical writing contests sponsored by STC chapters in your area? If they don't have a student competition category, nag them to add one. Do something to get some "expert" feedback on what is going on in the classroom. At best, you can wind up with some help in grading that could have much more impact on the students' attitudes toward writing than anything you could do or say.

Another possibility for bringing industry into the classroom is to get guest speakers who are not technical writers to speak to your classes on the importance of being able to write well in getting ahead in any chosen field. If you can get engineers, scientists, and business managers to do this for you, you may be able to motivate the student to do more than pay lip service to improving communication skills. I know that my own son listened more carefully to an engineering manager in his first college summer job interview than he ever did to me. And you may find, as Dr. Pearsall notes, that "technical men and women never appreciate how much they need writing until they are on the job. Once on the job, almost all become effective missionaries for the need to know how to communicate in words as well as numbers."[9]

In summary, then, there are some things you can do to improve your own skills and also upgrade the content of the courses you teach. What I have talked about here is hardly an exhaustive listing. I have not commented on most of the suggestions Pearsall makes in his short pamphlet, for example. And I am sure I have not mentioned the favorite tricks, ploys, teaching aids, and methods many of you have found effective. What I have tried to do is motivate you so that in the future perhaps none of us will have to ask: If I don't know, how can I teach you?

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THE INSTRUCTOR INTERNSHIP IN TECHNICAL WRITING

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Business and technical writing instructors in the university and writers in industry communicate very little with each other as a rule. Each group is already too busy with its own work to cross paths often with the other. As a result, both groups miss many of the benefits that closer correspondence would give them. The writing teachers who have moved into "professional writing" instruction from more traditional academic fields lack the practical experience they need for complete credibility and immediacy in the classroom. And industry, often without going to the university, spends a great deal of money in its own programs to train writers who arrive on the job without the skills they need. However, if each group deliberately seeks out the other as a resource, we can bridge some of this distance. One way of doing this is through an instructor internship, an arrangement where university instructors work part time in industry.

Both industry and the university work hard to produce good technical writing and good technical writers. Because we share this purpose, we can support each other in important ways, but neither of us finds it easy to communicate with the other because our paths do not cross routinely. Systems Engineering-Retail of NCR Corporation, Dayton, Ohio, and Indiana University East, Richmond, Indiana, have begun to bridge this distance through an arrangement we have called an instructor internship. This differs from more traditional student internships in that the writing instructors themselves, sponsored by their universities, come into industry to write and edit. In my particular case, Indiana University East granted me one-quarter released time from teaching in order to work in SE-Retail one day a week during the five months of the 1982 Winter Semester.

As we worked together, we saw our respective writing needs come into clearer focus. The computer industry generally seems to face needs in several areas:

1. A new generation of "user friendly" documentation directed toward the non-specialist and the specific tasks he or she needs computer products to do.
2. Non-threatening consultation and editing, especially with young writers early on in projects and long before formal review by the organization takes place.
3. Promising, new writers who are beginning a career.

At the same time, universities need several things in their writing programs, and in order to get them are willing to support their younger faculty as they go out into industry:

1. Technical writing instructors who are experienced technical writers.
2. The credibility and prestige that instructors early in their career gain from hands-on experience.
3. A good track record in placing students.

Because these needs are complementary, the working relationship between tech writing instructors and a publications department can be productive almost immediately. Writing instructors are good audiences for technical publications directed toward non-specialists. They are professional learners, the kind of people who might buy data processing equipment and teach themselves to use it. Realistically they can be asked to prepare themselves in particular areas of product technology before they come to work for a company.

Usually writing instructors are relatively good writers, even though they may not have much experience with writing outside the univesity or with day-to-day production. They are coming into industry for that kind of experience. They can be put to work immediately writing the sort of general documentation that writers on a job tend to push to the back of their desks, like general system descriptions, recruiting brochures, and policy and procedures manuals.

Especially important in their working with technical writers, writing instructors are professional teachers. They make their living getting students to understand what is meant by audience, purpose, style, and so on--the questions that professional writers must keep asking themselves. In teaching these questions to writers in a publications department, the instructors make use of many resources that are as unknown to industry as those of industry often are to them.

Instructor interns have the additional advantage for the publications department of being as temporary as outside consultants and considerably less expensive. They can make observations and suggestions in the interests of better publications without having any empires to build or any political axes to grind.

For SE-Retail and I.U. East, the relationship was sufficiently productive for us to recommend it to others.

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THE EDUCATION OF A WRITER--THE EVOLUTION OF A DOCUMENT

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For those who wish to become technical writers or who wish to change fields within the discipline, this paper presents a method to use in training oneself in the subject matter about which the writer will write. Based on the experiences of one professor-turned-technical writer, this paper sets forth the process of self-education leading to the acquisition of knowledge required to do one's job well.

Teachers of technical writing and students who want to become technical writers generally have a good grasp of grammar, mechanics, organization, and the specific approaches to report writing for different situations. What they may lack is the knowledge of a procedure to use to educate themselves on the subject matter that they are to communicate to others. How does one educate oneself on the job without a special on-the-job training program (which few if any companies have for technical writers)? The answer to that question is the subject of this paper: the education of a writer--the evolution of a document. It is based in large part on my own experience as a consultant to a major aircraft company, hired by that company to write reports on a subject of which I had no foreknowledge and, in fact, had never even thought much about. The approach I used to educate myself and produce the required documents is one that I believe will work for others.

PHASE I: WHAT TO DO FIRST

You've been hired because you write well, organize quickly, and produce clear, readable prose. It's your first day on the job and although you've come prepared with all your good writing skills, you don't know a thing about the specific subject matter on which you'll be writing. The person or people who hired you don't know how to train you and/or don't have the time. So you have to train yourself. Here's how to go about it.

Begin by gathering as many reports written by others before your arrival as you can. If the company has a public relations office and a sales office, you'll want to get material from these places, too. If the company has a style manual, you'll of course want to read that, too. You'll want to learn as much as you can about the philosophy of the company, the kinds of writing that others have done and that you will be doing, and the methods others have used. That is not to say that you want to copy the "old tradition." Oftentimes, it's very bad, and you, as a trained technical writer, know what it should look like (the principles of good technical writing), so you have some influence in changing format, style, jargon, etc. But first you have to see how it's been done.

When I was hired as a technical writing consultant, I spent the first several weeks immersed in a huge stack of reports written on other projects and on the project that I was to work on.

At first, none of what I was reading made sense. But slowly, as the weeks went by, I began to get a picture of the subject matter and what the reports were trying to do. With this glimmer of understanding, I then went back and re-read several of the more important documents. This time, things began to fall into place, the reports made sense, and I got a feel for what my job would entail.

PHASE II: WHAT TO DO NEXT

The first step could take several weeks to a month or more, depending upon your need to know, the complexity of the subject, your familiarity with it, and the amount of documentation the company has to share with you. The next step (Phase II) is to start educating yourself about your general subject area. You now

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have a sense of what others in the organization have written after they had something to say. What you lack is the background knowledge to be able to say something. This task takes longer and comprises several steps.

1) Understand the Audience and the Information that Audience will Need. Through talking to others on the job, learn what your reports are supposed to do, who will read them, what the audience's needs are, educational levels, interests, knowledge of the subject, etc. Then determine what kinds of information need to be in the reports. Make a list of the topics for which you will need to get information. The list could be a general series of questions, or, if you're so inclined, it could be an informal outline of the points you want to cover. More than likely, though, at this early stage, you don't know enough about the points you want to cover until you've talked to the experts. That's the next step.

2) Seek out the Experts in your Subject Area. These are the people who have the knowledge, gained through years of education and on-the-job training, but who generally keep it locked inside themselves because they hate to write. If you asked them to write down everything they know about a subject you're working on, they wouldn't do it. If you asked them to write anything on the subject, it's also highly likely they wouldn't do that either. It's not that they don't want to be helpful; it's that they dread writing and can always find something else that prevents them from doing it. So, you've got to capture their "black book" knowledge and put it down on paper.

Who are these people with all the knowledge that you need? They could be engineers, computer analysts, scientists, accountants. They are specialists. So are you. But you need information about their specialty in order to perform your specialty, writing. Call these people or go to see them. Tell them about the reports you're writing, explain why the information is important to the company (to give the experts a motive to spend some time with you) and that the experts' expertise will allow you to write a report that accurately states the problem, the situation, the solution, etc. Set up an interview or conference with each expert. Bring your list of questions. Give the expert a copy. Go over the questions with him or her. Write furiously, or, if the expert agrees, tape record the session.

3) Ask for a Demonstration of Relevant Equipment, Machines, or Processes. If the expert isn't the person to provide this demonstration, find out who that person is and arrange to meet with him or her. You can't really understand a subject until you've seen the thing in action. In fact, this step might precede the interview since some people do better gathering information after they've seen the machine or process in action. Others need some information first to understand what they'll be looking at. At the aerospace company, I was writing a major report on sheet metal fabrication, and I spent a lot of time with the experts on the shop floor, learning how the various machines work. Without that first-hand information, my job would have been a lot harder.

4) Put Something in Writing. Armed with your notes and growing understanding, you can now set about the task of getting something on paper. It's important to do this as soon as possible after the interview because if the information is allowed to get cold, you may not remember what you meant by your notes. The first draft will, of course, need a lot of work, but it's far easier to work from something than from nothing. You might begin by trying to organize the information into categories and then writing something in each category. Or you might try to match your original questions up with answers, such that you turn the questions into an outline from which you supply the answers in the form of a write-up. This first write-up completes Phase II of your education, but there's more work to be done.

PHASE III: LIBRARY RESEARCH

"A little knowledge is a dangerous thing," and you now have a little knowledge. Let it lead to more. Go to the library. Many companies have good in-house libraries. If yours doesn't, take a day to go to a college or university library or to the local library to get additional information on your subject.

Read the journals in your field of research. Every field of endeavor has one or more of these. In my consulting job, I regularly read Metalworking News and Aviation Weekly. If a journal is particularly helpful, subscribe to it. They're oftentimes free to members of the profession. Check out books on your subject. These will give you background information. The combination of books and periodicals will broaden your knowledge of your subject, give you information to add to your write-up, and raise new questions. These new questions may need to be answered through additional research or through returning to your in-house expert for more talks. In fact, in many cases you will read something that you think might be important, and by returning to your expert, you'll remind him or her of an important area that should be included in your report. In this way, your knowledge and the resulting document grow.

PHASE IV: THE REVIEW PROCESS

Satisfied that you have something presentable in draft form, you must now have it "pass muster" by those in the know. The first person who needs to pass judgment on it is your expert. You should encourage your expert to make comments about what's there, what's not there but should be, and what shouldn't be there. Be sure and give this person credit, too, in your document in its final form! With his or her comments, re-write the write-up to incorporate his or her suggestions, and then send the document on to your boss for review. Add his or her comments as well, and then if there are others in the organization who need to know what you're doing or who should see the write-up, send it to the individuals concerned for review and comment. Then, after incorporating their comments and suggestions, set the write-up aside. But don't forget it. The more you know, the more you'll understand. Keep reading, revising, and editing as long as time permits.

Meanwhile, start the same process all over for the next write-up for the document and the crash course in your education it will require.

OTHER TASKS

Rare is the situation where you'll only have one task to perform. As is more often the case, this will be one of many jobs. One hopes, however, that since you're new at it you won't be swamped with too many responsibilities at first. But one that you'll probably be assured of having is editing for others. If you're the only technical writer, you'll be the resident expert in your field. As resident expert, you'll be expected to edit the writing of the others. That's a task you will probably welcome since it's something you do know something about. One of the things you'll want to edit for is consistency. Since many people will be making contributions to the documents, you'll need to organize the information so that it looks and sounds as if it were written by one person.

Another task you may have is the development of a glossary or dictionary. I did one for the documents I helped write. It was a growing glossary that I continued to update as the documents grew. In it were all the definitions of terms that might be unfamiliar to the readers. It is my legacy to the project since it's the kind of document that will continue to be useful to future projects, as well as the current one. If your documents are written for a mixed audience (different levels of readers) and if they contain a lot of unfamiliar terminology, then a glossary will be useful and helpful. If someone hasn't thought of that job, maybe you should suggest it!

Still further, you might be asked to oversee the document in its development, a task which entails making sure that the others are kept on schedule, that the write-ups come in as they should, that you edit them, that the proper reviewers review them, that they go to typing with enough lead time, that the covers and binders are ordered and arrive on time, that the correct number of copies gets made, and that the documents are delivered on schedule. If illustrations are required, the arrangement for these will also have to be made--probably by you.

Sounds like a lot? Well, it is. But if you're well organized, eager to learn, and believe in the value of good technical writing (which you all do or you wouldn't be reading this, then you'll get the job done. Students who want to become technical writers will be better placed and enjoy their jobs more if they have a feeling for what is involved in the job and the way to go about educating themselves on the job for the task. Instructors who teach technical writing and would also like to work as technical writers in industry can profit from knowing what to expect and what will be expected of them.

In my own experience as a professor of technical writing at a college of engineering technology, I knew what technical writing was supposed to do. As a consultant to business and industry, teaching seminars to people who write on the job, I knew what on-the-job writing was supposed to do. What my background lacked and what I sought was an understanding of what machines do and the research process involved in finding that out. As a result of my experience as a technical writer/researcher, I understand my students' work environment from an insider's perspective, I recognize even more clearly their need for good communication skills, and I now speak their language. The steps I used to educate myself as a research writer (which allowed for the evolution of the documents) you can, too.

ED239266

Training Technicians to be Better Communicators

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This paper will compare and contrast two different in-house training programs: the first a two-hour seminar for over-the-road transmission technicians, and the second a formal six-week course for nurses and technicians. The differences between the two types of training will be discussed, and they will be compared to campus technical writing courses. Suggestions will be made.

This paper will compare and contrast two different in-house training programs: the first a two-hour seminar for over-the-road transmission technicians and the seconi a formal six week course for nurses and technicians. The differences between the two types of training will be discussed, and they will be compared to campus technical writing courses. Recommendations will be made.

Academic consultants frequently work with in-house seminars and continuing education programs directed at working technicians. This experience is educational for both parties--the instructor--used to campus courses in technical communication--and the technicians--who desire instruction useful in improving their on-the-job performance. Both have differing expectations.

For the consultant, conducting the course is like entering a different world, divorced from the academic world. For the technicians, working with the consultant is affected by their attitudes toward writing, the writing they do on the job, and their social attitudes.

Much can be learned from these experiences, and inferences can be drawn about the nature of technical communication classes off campus, about the varied kind of technical communication courses, about the teacher-student interaction in the courses, and about the differences between these classes and those on campus.

Transmission Technicians

These technicians came from seven regions throughout the country--including the states of Kansas, North Carolina, California, Pennsylvania, as well a Ohio. They are called service technicians. All male, they answer complaints about large over-the-road truck transmissions. They may find the customer to be agreeable or irate, more likely the latter. And they deal with service managers as well as private operators. These technicians must literally stand behind their product, and if the transmission does not function efficiently, they may find themselves at the receiving end of a fist. They usually only see the problems and rarely the successes.

Nurses and Hospital Technicians

In stark contrast to the first group, this one is composed of women for the most part. They work in the highly structured, bureaucratic atmosphere of the hospital or hospital physician's office, unlike the service technicians who work alone on the road. They too deal with irate customers at times, but they encounter death and severe illnesses daily; or they can deal with patients meeting the physician on a less traumatic occasion, say for a routine check-up or a minor illness. We all have dealt with hospital nurses, and I believe that we can agree that unlike the transmission technicians, they suffer less physical and more psychological stress.

As the instructor for these two groups--one in a two-hour seminar and the second in a six-week-long course--I found myself as a female with a Ph.d. thoroughly scrutinized and appraised. I also encountered first hand the needs and expectations of an audience of technicians.

Characteristics of a Technical Audience

As the textbooks point out, technicians do not want theory (as opposed to an expert audience) but desire practical information

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given concisely and quickly. They have a show-me attitude. This assumption has been borne out by my experience. The transmission technicians were primarily interested in what their supervisor wanted them to learn. If anything, they believed that not only did they know how to do their job well but also that I had little to tell them. I represented perhaps unnecessary information, interesting, educational, but essentially not useful.

The nursing and hospital employees perhaps might have been expected to have been more receptive, and to a degree they were. However they are a special case: working in an area dominated by male physicians, they frequently have a sense of powerlessness and frustration. I might have expected this attitude to make them more sympathetic to me, but I did not. Previous experience with teaching nurses has suggested to me that while they might resent the male physician's sometimes autocratic attitude, they still take and expect to take orders from a male. Women are tolerated but sometimes questioned in positions of authority. I was therefore suspect to both groups, first as a woman and then as a woman academic--the first because women in authority are suspect and the second because those in higher education are suspect.

Formats of the Courses

Transmission Service Technicians. The primary objective of the seminar was difficult to ascertain at first. I had thought that the problem was bad communication, caused by poor syntax, poor diction, etc. However, the examples I was given did not suggest that. There were poor grammar (sentence fragments) and poor spelling, but given the context, to explain in a few lines the nature of the customer's complaint, I thought sentence fragments were effective. When I stated this, the assistant manager of the department looked as if I had suddenly spoken Chinese. What, an English teacher (others do not distinguish between technical communication and English) who thought sentence fragments were acceptable? I felt as if I had somehow failed him. What was the problem? If the samples I had were communicating the complaints, what needed to be changed?

It was an audience problem. The supervisor was being embarrassed by the poor grammar and spelling. Company engineers were sent copies of the service technician's reports so that bad designs could be remedied. They had different expectations about reports, and they let the manager know that his personnel were using poor grammar. They apparently did it so that all would know, and the manager wanted this ribbing stopped.

I had then to communicate to the technicians that their manager was displeased and that his displeasure would affect their jobs. Even though I believed that their writing was understandable, they had to correct this problem. Immediately.

Besides the objective of making the technicians aware of their audience problem, there was a second one. The company was concerned, as many are today, about possible court cases. Specifically, they feared the possible subpoening of their reports which described manufacturer defects.

After a couple hours of discussion, I found myself about to instruct the service technicians to write correctly, not to necessarily communicate more clearly but to satisfy a secondary expert audience. And I found myself instructing them not to be too lengthy in order to forestall future court litigation.

Nurses and Hospital Personnel

Here the objectives of the course were determined by me and the director of the Continuing Education Program. They were to analyze audience, to deal with problem solving, to know format and organization of short reports, and to improve language skills. I assumed everyone would read them. I also assumed that this was more of an academic course. In both I was wrong.

I also assumed that audience analysis would be a major concern to this group, since they worked within the large institution and had to deal with a variety of people.

Course Content

Service Technicians. After consulting with the Assistant Manager and Manager, I decided to include these five areas in the two hours allotted:

1. Introduction to the descriptive view of writing.

2. Definition of technical writing. Informal vs. formal reports.

3. Audience Analysis.

4. Examples of problems from their own reports with suggestions for improvement.

5. Legal aspects.

I wanted to include the introduction because many have been indoctrinated by the prescriptive view of language. This was the most general part of the seminar, and I doubt whether its purpose was achieved. The rest of the seminar focused on their own reports.

One example I used was the following: "A brief inspection of the cross shaft holes reveillcd badly worn bushing. Also notice that these housing did not have seals for busing installed." Regardless of the mistakes in grammar and spelling, as well as the missing article, to me this description was clear. I could point out that the two sentences were wordy and the mistakes in grammar and spelling would catch the attention of the college-educated engineers. They wrote quickly in the field and hurried on to another customer and another complaint. There the emphasis upon spelling and verbs seemed insignificant, but in the central office, where the report would be circulated with their names, these mistakes would become glaringly obvious. They would then hinder the engineers or the clerical staff from perhaps taking the report and then too seriously. This they would certainly wish to avoid.

In the area of legality, the technicians had to be cautioned against putting too much into the report. For example, they might insert in the previous example, "Also noticed that these housings did not again have seals for bushings installed" (my emphasis). Or they might insert that this was the third such complaint, thereby establishing a pattern or series of manufacturing omissions or mistakes.

These were my suggestions:

1. Write specifics only--stay away from drawing conclusions.

2. Never keep more than is absolutely necessary--this means not only files but also appointment books and calendars.

2. Throw all outdated material away.

And, finally, my most emphatic point was simply to turn to their manager, who nodded in agreement, and state, "You simply must improve your writing, if you are to get anywhere in your job."

Nurses and Hospital Technicians. I found that my proposed objectives--to teach format and organization, audience analysis, problem solving, and language skills--were not easily accomplished. A week was devoted to each subject, with the remaining time devoted to working with specific examples. This proved to the most rewarding aspect of the course: having each participant bring in examples of previously written reports or letters, or having them bring in current assignments needed for the job. For some these were simple descriptions of patients' physical symptoms. The hospital form had been drastically revised to give the nurse more responsibility for record keeping.

This change was part of a related attitudinal change by and toward nurses. Nurses had previously (and still are) been treated by doctors as being unimportant in the patient's care. But as they obtain more education (for many nursing jobs a Bachelor's degree is now required and the Master's is becoming more common), their prestige increases also. Another related factor might be the women's movement which seems to have affected the way nurses see themselves in relation to the physician.

I found that their expectations of the course were to improve their ability to write, to write quickly and concisely, to avoid wordiness, and to develop ideas. They too were worried about excessive documentation and the legal ramifications. They were unit clerks, nurses, and clerical staff from the volunteer department. One or two were there to learn how to write better to get a better job; others were there to get course credit (which helped them also for promotion); and others had been instructed to go by their employers. They were interested in practical assignments, and yet they essentially did not like to write, or rather, they felt inadequate about writing, and like others, had concluded that writing was either a mysterious process or a simple result of getting ideas. This latter characteristic created some problems. For a writing teacher like myself cannot teach without having the participants write; and an audience such as this one is uninterested or ill-prepared for any degree of theory.

Results

In comparison with campus courses, I found these to be directed toward people who did not need to be convinced of the reasons for learning better writing skills. Their supervisors were sometimes sitting in class with them, or they had been told to report back on their progress.

Like our students, these technicians sometimes regarded language as mysterious or banal--overwhelmingly difficult or simple once the instructions were followed.

Like students in university classes, the reason why these technicians had the most trouble with their writing was a lack of audience analysis. Or they had suffered on the job because they had not learned it yet.

Their jobs were constantly on their minds, and their jobs were fast-paced, utilitarian, as opposed to the college student, whose classes sometimes seem quite removed from their "real" life. In a college course we sometimes have the luxury of time; in an in-house course we must prove that everything we say is necessary for them--not interesting for us.

Service Technicians. Including a discussion of the beginning of the English language or of prescriptive grammar is unnecessary and undesireable. The point being made is unnecessary--that the engineers are language snobs. They are the audience and need to be addressed. The practical rule is that wrong language is inappropriate for this particular secondary audience and that it does not communicate to that audience. This confusion is one made in college courses as well.

Nurses and Hospital Technicians. Too much theory is again unnecessary. The instructor must adjust for this audience. Rather than scheduling a discussion of grammar late in the course, it should be addressed first. For this is the expectation of most technicians. They believe that grammar is communication. They will be easily lost from the course if that expectation is not met. Their assumption must be discussed, and the difference made clear. No theoretical assignments should be made--such as finding examples of writing for an expert audience. Instead all assignments should be examples of actual writing done in their jobs.

Recommendations

1. Little formal discussion of grammar, except where appropriate to writing done on the job.

2. Little outside reading should be assigned. Lectures and attention to the writing actually done by the class should be emphasized.

3. Audience and purpose should be emphasized, but they should be related to the work they actually do.

Finally, in-house training courses will be shaped by the needs of the participants. Therefore, they will be each to some degree individually designed. Questions must be asked before the class to determine the kinds of writing done on the job and the kinds of audiences who receive them. With these recommendations in mind, academic consultants can adapt a generalized course to a specialized one for technicians and teach them how to be better technical communicators.

TEACHING ENGLISH AS A SECOND LANGUAGE TO NON-NATIVE SCIENTISTS AND ENGINEERS

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The problem of how best to intensify and expedite the English-learning experience of specific foreign-born lab scientists was solved by incorporating the teaching of English as a Second Language into the role of technical editor. An initial screening program to determine the level and needs of each student included both oral and written material. For the former, the student was asked to read newspaper and journal articles and answer questions about their content. The written testing involved a series of word usage and grammatical exercises. Subsequently, the student's facility was evaluated. An early decision was made to concentrate on two areas --improvement in the student's spoken English and increased confidence. A dialogue format, which incorporated problem areas and utilized topics relating to the work setting, was developed and turned out to be a most effective teaching tool. As fluency increased, so did confidence.

Our research laboratory employs a high percentage of foreign-born scientists having various degrees of English competency. As a technical editor, I often worked closely with them, explaining changes to their texts and the subtle nuances of the English language and correcting their spelling and pronunciation.

Having a love for languages, formal education in Spanish, German, and Hebrew, and some familiarity with French and Italian, I found I could interpret the more obscure facets of their prose with some facility and diplomatically indicate more intelligible alternatives. One oriental scientist in particular considered my comments more constructive than the course he had taken (at company expense) at a well-known language school. He also appreciated my patience and creativity.

Consequently, when another oriental employee needed practice in English conversation, I was asked to help. Thus, I embarked on a new communication role -- that of English language teacher.

It has been a few months since I began and I would like to share some of my observations and experiences. I had decided that our first meeting would be spent conversing so that I could diagnose general problem areas. In subsequent sessions, I judged his facility in reading articles from a newspaper at the difficulty level of the New York Times or the Wall Street Journal (no obstacle) and in changing tenses from past to present and vice versa (also no problem). Grammar tests from various textbooks likewise presented no difficulty. However, my student definitely had problems in answering questions or holding discussions based on the content of the articles. He also was uncertain about vocabulary choices in word games, both in choosing the word and pronouncing it, and then using it properly in a sentence. This problem was intensified when he was called on to speak extemporaneously.

We agreed, therefore, that our goal would be to make him as comfortable as possible in his speech and also to expand his vocabulary.

Concurrent with the approximately ten one-hour sessions of this diagnostic period, I did as much reading as I could on the subject of teaching English as a Second Language and consulted with a few people in the field. Because of the high achievement level of my student both technically (he had two Doctorates) and linguistically (he did have a good, although dormant, knowledge of English), little of what I read seemed directly applicable. I realized I would have to improvise.

Since this scientist was expected to discuss work-related issues regularly with other company personnel, we began a series of dialogues about his work. I asked him to describe the equipment he was using, the experiments he was running, and the problems he was encountering, and noted mispronounced words and grammar errors. Working together, we devised sentences using these phrases and then created new dialogues around them. I found I had to distinguish between words that were more difficult for him because their sounds were not part of his native language, and those that had never been part of his vocabulary. The ones that gave him the most trouble were repeated day after day until they were mastered. Synonyms, antonyms, homonyms -- all were brought in whenever and wherever necessary. Each led into another lesson.

When my student was given the responsibility of technical liaison for an industrial plant, I changed the focus of the lessons to the specific problems he might encounter. First, I suggested he contact the previous representative for information about the job and the personalities of the people with whom he would have to work. During our next meeting, I coached my student on the pronunciation of the names of the people at the plant, and sat in as the previous incumbent described his plant visits. Based on this briefing, in a subsequent session, we simulated a telephone conversation in which he called the manager at the plant, introduced himself, and set up a visit.

In preparation for his first plant visit, we talked about how to make plane and car reservations, and how to obtain services at a gas station. Some of his problems in these areas were of long standing. I was aghast at what must have been his frustration wrestling alone with them for so long.

It was interesting to note my student's reaction when at one point in the guise of the plant manager, I asked him, "How did you enjoy your flight down here to the plant?" He responded, "Would he really ask me that?" I told him that Americans expect a certain amount of social interaction. He would have to become accustomed to questions that he might find slightly intrusive, but he could always hedge a little when answering.

The previous sentence brings another topic to mind -- idioms. To a non-native speaker, the words "hedge a little" are a puzzle. For instance, when we had our meeting with the person he was to replace, I acted primarily as an observer. What I observed was startling: some people seem to talk only in idioms. For example, our visitor seriously intoned, "Don't let them put you on the spot." I could almost see my student's mind working: "I must remember not to let them put me on the spot; I wonder if I'll be able to see it on the floor." We had an interesting discussion about that phrase.

Certain words still are a challenge, but the scientist's facility with the language has improved greatly. He is more likely to join others at the lunch table and enter into the conversation; he speaks up at department meetings. And he doesn't let anyone put him on the spot.

Introducing the Cloudiness Count

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CAN THE COMPUTER TELL YOU HOW UNDERSTANDABLE YOUR WRITING IS?

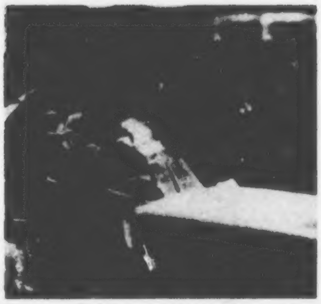
Over the past forty years, several language experts have developed various formulas to measure how readable a given sample of writing is. *Without exception*, these formulas measure only two factors—word length and sentence length. Is that sufficient, or are they missing the counting of *other* more important factors?

After studying how useful those readability formulas are for evaluating the prose of business and technology, I concluded that they did not give an accurate measurement. Why? Because they completely ignore two very important faults. I have found, after examining hundreds of documents, that there are two characteristics in the language of business and technology that make it difficult, and sometimes impossible, to understand—especially for the public at large:
First, a heavy overuse of abstract words;
Second, a heavy overuse of the passive voice.

I believe that those two characteristics, not long words and long sentences, are the roots of our problems. Therefore, I formulated a new tool—the Cloudiness Count. Unlike older formulas, which ignore abstract words and the passive voice, the Cloudiness Count directly measures those two poisonous agents of obscurity.

By computerizing the Cloudiness Count, I made it easy and convenient to quickly analyze any sample of writing, from a single sentence to a whole passage. There are no complicated formulas, no complex computer operations, no results that are difficult to interpret.

It works. And it is easy to use.



He sat there, staring into the tube, his ego deflated. The computer displayed its rating of his writing: FOGBOUND.

TRAINING THE TECHNICAL EDITING STUDENT IN INTERPERSONAL SKILLS

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In Lawrence Livermore Laboratory's excellent *Guide for Beginning Technical Editors*, Wallace Clements and Robert Waite stress how important good interpersonal skills are to the technical editor. Using the *Guide* as a reference source, this paper suggests specific ways to improve the inexperienced editor's interpersonal skills. It does so by suggesting that the editor get involved as fully as possible in the writing process so that the editor can perceive the interrelated nature of writing and editing by participating in both through role playing and peer evaluations. With some modifications, this approach can be adapted to in-house training programs which already stress the more mechanical aspects of editing (i.e.--formatting, style, grammar, and spelling).

INTRODUCTION

In Lawrence Livermore Laboratory's informative, concise *Guide for Beginning Technical Editors* (an excellent supplemental text for any beginning or advanced level technical editing class), Clements and Waite note the important role that human interaction plays in any technical editing assignment whether it be "finishing" a technical report or getting an in-house publication ready for the printer. They offer the inexperienced technical editor six pieces of advice, and, because these points are important to my discussion, I will include them here:

- Avoid making major editing changes based on only superficial consideration of the author's draft.
- Take adequate time to try to understand the author's intended meaning before questioning him about it. Again, don't be superficial.
- Avoid getting into adversary relationships with the author.
- Be flexible and responsive in accommodating your schedule and working procedures to the author's situation.
- Be reliable in carrying out agreed-upon changes and corrections.
- Be sure you are a help rather than a hindrance to the author in getting his manuscript published (1).

The above six points illustrate one common theme: it is important for editors to have good interpersonal skills in order to work successfully with authors. The editor must be able to listen "actively" to the stated and implied meanings conveyed in the manuscript, and he must also be able to carry on a constructive dialogue with the writer in order to clarify fuzzy thoughts that might cloud the meaning of the manuscript. Using the general principles discussed in *Guide for Beginning Technical Editors* (a text I use in my course), I teach technical editing through a workshop approach which stresses not only the technical aspects of editing, but also the importance of interpersonal skills through the use of role playing and peer evaluation.

OBJECTIVES

At Clarkson College, technical editing is a course designed to examine the process of taking a manuscript from rough draft to publishable form by involving students, many of whom are technical communications majors and future majors, as completely as possible in the writing/editing process. Divided into four interrelated parts, the course is structured to cover the composition of the journal article, writing style, editing principles and practices, and tutorial instruction. In addition to generating their own manuscript which they submit to a journal of their own choosing for publication, students are exposed to a number of in-house editing manuals, are involved in writing abstracts for different journal articles, and design different communications for various audiences. Enrollment is restricted to 15 students so that a workshop atmosphere can be maintained.

On the first day of class, several new concepts are introduced which will figure prominently in the course. Role playing is encouraged as each student assumes the position of editor on an editorial board, a role that the student keeps throughout the duration of the course. Role playing accomplishes at least two things. It helps break down a potential barrier to communication (the instructor as authoritarian figure), and it helps dramatize the close relationship between writing and editing, as students will be engaged in both for the remainder of the semester. After the course objectives are outlined and explained, discussion shifts to defining the editor's responsibilities. We read Mary Fran Buehler's article on the different levels of edit, and note, among other things, some of the distinctions to be made between copy editing, manuscript editing, and mechanical editing (2).

Finally, the remainder of this period and a portion of the next (the class meets for an extended period of 75 minutes twice each week) are given over to the drawing up of a contract that specifies the number of manuscript drafts each student will generate during the semester. Regardless of the total number of revisions agreed upon (usually four or five), the contract has built into it a degree of flexibility to permit adjustments in the final number of drafts should unforeseen research or technical problems arise. By having the students participate in designing the contract, they are involved actively in structuring the course and see how important discussion and interpersonal skills are to obtaining results that are mutually beneficial to all involved.

DISCUSSION

In the next few weeks while students research their topics, we discuss the format of the project proposal as each student will be submitting one. We also identify the chief responsibilities that a good editor has to the writer and the writer's audience, noting foremost the editor's responsibility to expedite information transfer--the primary goal of all communications. Time is also spent demonstrating the important role that interpersonal skills play in the life of an editor.

To accomplish this second goal--demonstrating the importance of interpersonal skills to editing--the instructor may wish to employ one of two techniques. He may wish to role play with another faculty member a dialogue between a writer and editor about suggested revisions on a manuscript. Even as part of a role playing situation, the dialogue between writer and editor usually prompts thoughtful debate about the kinds of interpersonal skills and questioning techniques that best work in editorial sessions. On the other hand, the instructor may opt to play a videotape of a live session between a writer and an editor. In either case, students are attentive for they will be involved in similar role playing situations in the weeks that follow.

ORAL PRESENTATIONS

By week five, most of the principles of good editing have been discussed to some extent and students bring a proposal to class outlining their manuscript topics. At this time, the parts of the manuscript are also presented in lecture form with the aid of an overhead projector to illustrate various letters of transmittal, abstracts, introductions, and headings. Each student delivers a short oral presentation before his peers explaining his subject selection, outlining its organizational structure, and noting any potential research problems.

These short, oral presentations prompt editorial feedback on a variety of issues ranging from the intellectual choices a writer and editor must make in order to arrive at a decision as to the type and quantity of material to include, to the more mechanical decisions that a writer and editor must make. Style sheets like the *MLA Handbook*, the Chicago *Manual of Style*, and the *U.S. Government Printing Office Style Manual* are brought to class and discussed as varying approaches on matters of documentation and style. Graphics are also discussed briefly as aids for illustrating and integrating complex data into the text.

THE FIRST DRAFT

The following week students participate fully in the process of writing and editing a manuscript, bringing two typed copies of their first draft to class. They are reminded beforehand that this initial copy should be detailed enough to promote meaningful editorial feedback, but it should not be developed enough to be considered a finished copy worthy of a grade. Students usually work in dyads, paired if possible on the basis of topics or common majors, for a peer evaluation.

After they are paired, each student is given a list of questions that the instructor has drawn up to be used as an aid for promoting constructive dialogue between the writer and editor. Students may add to, delete, or ignore the list entirely if they see fit. As they read each other's manuscript, they make written comments on a separate sheet of paper, noting positive as well as negative features. After completing their written notes, the students converse on their manuscripts, explaining comments and asking questions on areas that might be problematical. My editorial comments are made on the second copy which is returned to the student during a conference later in the week.

Overall, this session is usually a very rewarding one for in a workshop setting students learn to appreciate the writing act from both a writer's and editor's perspective. As editors involved in the writing act, they gain a better understanding of the writer's perspective and of the difficulties encountered when one tries to express abstract ideas as clear prose. As editors, they learn to value the tips presented in the *Guide for Beginning Technical Editors*. First, they learn to be flexible and responsive to the way the writer views his own manuscript. Second, they learn to temper their instincts to be critical by developing good interpersonal skills so that editorial restraint is exercised when suggestions on matters of organization and style are made. In short, they learn to be thorough rather than superficial.

THE GROUP EDIT

After the initial draft has been written and after peer feedback has been provided, the revising process begins. The initial revision can be written in a week. Students then meet again in class for a peer evaluation, but this time in the form of a group edit. Here students structure a 10- to 15-minute presentation before their editorial peers, using an overhead and transparencies to illustrate revision in their manuscripts.

Within one extended class period, five or six presentations can be given.

This group edit session helps to sharpen the students' interpersonal skills in several ways. First, students have the opportunity to demonstrate how well they listened to editorial advice by discussing the tactics they used to resolve problems present in the first draft. Second, they must present a technical subject competently before peers who will need enough information on background, methodology, and audience to provide informed editorial feedback.

Perhaps of greater significance, the group edit session helps to sponsor multiple, often conflicting, editorial viewpoints which, when presented tactfully as outlined in the *Guide for Beginning Technical Editors*, provide the writer with important feedback for future revisions. In short, by being involved actively in the totality of the writing experience, students help significantly to shape each other's manuscript.

One or more group edit sessions are held on subsequent manuscript revisions, the number depending on the specifics outlined in the group contract drawn up in the opening weeks of class. Like the first group edit session, these subsequent periods maximize the amount of time spent on peer feedback and help sharpen the inexperienced editor's interpersonal skills.

Transparencies used in the first group edit may be referred to again in order to illustrate changes made. Each student demonstrates what has been learned in the revising act and also shows what new information has been processed. The presentation time is longer, usually 15 to 20 minutes, to permit the writer time to develop his argument or proof and to solicit informed editorial feedback regarding content and organization. Since the introduction of the manuscript should be pretty much in final form, more attention is given to the body and terminal sections, making sure that the latter proceeds logically from the former.

THE FINAL EDIT

The final editing session focuses on matters of style. Usually opting for a dyadic format, students carefully read each other's revised manuscript, checking initially to make sure that all the parts appear in the proper sequence. After this initial check has taken place, the editor reads the abstract, introduction, conclusion, and summary of the manuscript to spot difficult terminology. Because these sections reach the widest audience levels, the editor checks to make sure that there has been enough tailoring of the writing to reach the multiple audience levels who might read these sections.

Next a sentence-by-sentence editing of the body of the manuscript commences. Here students have the opportunity to bring their wordsmithing skills into play, but they are reminded that restraint is the key watchword, for the editor should not try to impose his own personal writing style on the author. He is reminded, however, that he should correct errors in grammar, including reconciling subject-verb disagreements, eliminating excess wordiness, and remedying the inappropriate use of the passive voice. The editor should also check for such "linguistic noise" as misspellings, punctuation errors, and improperly labeled and captioned figures.

The final 10 days of the semester are devoted to conferences and the typing of the final manuscript. During conferences, I return my edited revision of their last working copy, and we discuss any final matters pertaining to style. We meet the last day of class, and they submit their material for publication. This material includes the original manuscript, any copies that the journal may require, my copy of the manuscript, a pre-addressed, stamped 8½ by 11" packet for the return of the manuscript, and a stamped, addressed packet for mailing the material. At this time, we also review the contract and resolve any matters left unsettled.

GENERAL CONCLUSIONS

Lawrence Livermore Laboratory's excellent *Guide for Beginning Technical Editors* not only offers a detailed approach for training technical editors in the more technical aspects of editing, but also emphasizes the importance of interpersonal skills to any editing assignment. Incorporating the guide's six points into a workshop setting can provide the instructor or trainer with an excellent approach for teaching interpersonal skills through role playing and peer evaluations. By involving the would-be editor totally in the writing/editing act, the editor learns to see the manuscript from both the editor's and writer's perspectives. Consequently, he learns, as Clements and Waite mention in *Guide for Beginning Technical Editors*, the most important lesson of all: to be a help and not a hindrance to the writer in getting his manuscript published.

NOTES

1. Clements, Wallace and Robert G. Waite. *Guide for Beginning Technical Editors*, Lawrence Livermore Laboratory, Livermore, CA, October 1979, 3-4.

2. Buehler, Mary Fran. "Defining Terms in Technical Editing: The Levels of Edit as Model," *Technical Communication*, Volume 28, No. 4, 10-15.

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TEACHING WRITING FOR THE COMPUTER INDUSTRY

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Ideally, a course in writing for the computer industry has specialized components: an instructor familiar with computer publications, students with some programming background, access to computer equipment, and the support of technical communicators in the computer industry. Industry professionals have provided both computer documents and insights into the working environment of their technical writers. Consequently, the course design emulates writers' tasks within the technical publications cycle. Students learn to evaluate existing manuals, plan, research and write documents, edit and test each other's work, and revise their edited manuals.

I began teaching technical writing at Northeastern University armed with a standard--and very good--technical writing text and two misconceptions. The first was that all technical writing students would be interested in the kinds of documents computer companies produce and the writing, review, and production process. The second misconception was that the standard text with its focus on technical reports would suffice for students who wanted to be software technical writers. It took less than a month to realize how mistaken these preconceptions had been. As a result, I am now teaching courses in Writing for the Computer Industry and am compiling materials for a text.

RATIONALE FOR THE COURSE

This course is a noticeable departure from the more traditional technical writing course, and as such, deserves some explanation. Its rationale arises from three sources: employment requirements, my own technical writing background, and the interests of specific groups of students.

Massachusetts' economic base in high-technology industry is increasingly recognized. The great majority of advertisements for technical writers here are placed by computer-related companies. The relationship of these ads to the course's existence is straightforward: if prospective employers are seeking software technical writers, it is the business of interested technical writing teachers to offer courses that teach these skills.

The area's high-technology orientation coincides happily with my own two-year background as a software technical writer for IBM in Rochester, Minnesota. (This invaluable experience accounts for my bias toward presenting computer documentation and the technical publications review cycle in technical writing classes.) Putting two and two together, I reasoned that I could teach a course in documentation that would prepare students for jobs as software technical writers.

Finally, of course, one needs students for a course. Our students are: English majors interested in careers as technical writers; adult, graduate-level students retraining for second careers as software technical writers; and, majors in Northeastern's newly created College of Computer Science.

THE PROCESS OF COURSE DESIGN

Once I had determined the need for this technical writing course, I began its design. I reviewed my experience as a software technical writer for IBM and listed the components of a course that would help prepare a person to join a technical publications department in the computer industry. That list of components differs significantly from the contents of the standard technical writing text and course. It is as follows:

1. An explanation of the technical publications review cycle, including:
    a. The writer's role in planning, researching, writing the draft, and making revisions;
    b. The editor's role in working with the writer on organization, style, format, and company style guidelines;
    c. The technical reviewers' roles; and,
    d. The production staff's role in working with the editor, writer, graphic artist, and printer in preparing camera-ready copy and reviewing printed copies.
2. A description of the different audiences for software technical publications.
3. An explanation of the difference between making revisions to existing documents and writing a new manual.

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4. Criteria for evaluating existing computer documentation, including organization, style, reading level, layout, use of graphics and color, typeface, paper quality, and binding.

5. Instructions for writing a wide variety of documents, ranging from concepts materials for executives to operator's guides, training materials, software reference manuals and summaries, to hardware documents for industry maintenance personnel.

In the late summer and fall of 1982, I and a colleague, Bill Coggin of Bowling Green State University, visited Boston area computer companies, spoke with representatives of other computer companies, and asked for advice from members of Northeastern's College of Computer Science and Academic Computer Services. A variety of publications managers spent many hours with us, identifying how their publications departments work and what things they would like technical writing students to know. They placed the greatest emphasis on three things:

1. The structure of their technical publications process from planning through review and production;

2. The production and printing process, which in some cases is evolving to a system in which a document is entered by the writer into a computer file, is edited and revised on-line, and is photo-typeset directly from this file; and,

3. The working relationship writers have with their developers, editors, and production staff.

Initially, when I had outlined the course, I had imagined writing "cook books" for a variety of software documents. For example, I might have written: "For an operator's guide, start with numbered instructions and add several reproductions of display screens." I anticipated that several handouts on the many kinds of computer documents would form the bulk of the course. Through the interviews with industry, it became clear that there were fewer differences between kinds of computer documents than there were things they had in common, particularly in terms of the review and production cycles. Publications managers were less interested in our teaching students how to write specific documents than in our teaching students how to work as writers in a technical publications department.

From a different perspective, the dean of the College of Computer Science encouraged our giving students practice in writing a wide variety of computer documents. He pointed out that programmers often have no conviction that documentation is important, nor do they understand the metamorphosis software documentation must undergo between the time it exists as specifications and the time it is released as a variety of user manuals and marketing materials.

THE COURSES AS THEY ARE TAUGHT

Writing for the Computer Industry is taught to undergraduate English and Computer Science majors, and to students in Northeastern's graduate Technical Writing Training Program. The courses have the same content, although the Training Program courses extend over two quarters, allowing for more depth in each of the areas. The Training Program also requires a lengthy, original computer document as a third-quarter project.

Course content is presented in this order:

1. An analysis of the audiences which read computer documents and an identification of the kinds of documents that exist.

2. Criteria for evaluating existing documentation. This section includes evaluating layout, graphics, color, and other mechanical elements of documents. It also includes evaluating whether the style and content of a document are appropriate for its identified audience.

3. An explanation of the publications review cycle, as discussed above.

4. Practice in editing and revising existing documentation and drafts.

5. Practice in evaluating existing syntax formats and software descriptions.

6. Writing new information, including a "concepts" or introductory piece for an executive-level audience, and an operator's manual on a software application. First quarter manuals included instructions for text editing packages (Digital's Runoff and EDT), simple applications in high level programming languages (BASIC, PASCAL, and FORTRAN), and a simple graphics package (the UCSD PASCAL turtle graphics function).

7. Practice in laying out a page to include graphics, heading levels, and lists.

8. Practice editing another student's manual. Students edit a draft for organization, style, and grammatical errors, and write a one-page editing evaluation.

9. Practice testing documents. Each manual is tested by two students working as a team. A testing evaluation is given to the author and to me.

10. Revision and preparation of a final draft.

Students are encouraged to do as much on-line writing as they can, and to submit letter-quality printouts as their written assignments. Because students have some programming experience, they write their operator's manuals on software they actually use. Frequently, their concepts documents are also on topics with which they have hands-on experience. And, of necessity, all testing is done on-line.

On-line work has two advantages. First, it is the same media most of them will work in when they get jobs as technical writers. And, it is simply good practice to use it. Second, it is more comfortable--perhaps even more fun--for the computer science majors to compose on-line than with pencil and paper or typewriter.

INDUSTRY SUPPORT

I cannot overemphasize the helpfulness of members of technical publications departments in designing this course, and in preparing materials for a text. Companies have been very generous in providing computer documents ranging from small, "pocket" summaries to ring binders filled with software documentation worth hundreds of dollars to the companies. Representatives of Computervision, Data General, Digital Equipment Corporation, Gould (Modicon Division), Honeywell, and IBM have provided materials.

In addition to printed documents, Dr. Coggin and I have received printouts of cover sheets and publications schedules, organizational charts, flowcharts of the publications cycle, and tours of publications facilities. Members of technical publications departments are excited about their work, and are delighted to share information with people committed to teaching students how to become technical writers in the computer industry.

CONCLUSION

The quantity of material that can be taught in a course in writing for the computer industry makes its own argument, aside from the ever-present issues of job preparation. The ideas and materials I have outlined above justify the existence of a specialized course. It would not do to try to compress this information into a standard course format taught with a standard text. The burden on me as a teacher is to continue to offer and develop the course. The burden on the students is to recognize the importance of such a course if they intend to seek jobs as software technical writers.

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A DOCUMENT DESIGN MODEL
APPLYING RESEARCH TO TECHNICAL WRITING

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Dr. Battison started the Document Design Center's newsletter, *Simply Stated.* He works with corporate clients to produce clear and useful manuals.

This session at the ITCC will be an interactive workshop. We will share insights from four years of research, practice, and curriculum development. Participants will learn about the Document Design Center's process model and will use it to analyze sample documents. Participants will learn about research in linguistics, psychology, and design and how to apply research findings in their own writing and in their classrooms. We will also discuss techniques for evaluating documents—what readability formulas can and cannot do for you, and what you can learn by having readers test your documents in other ways.

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The Document Design Center is a research and resource group that is part of a non-profit R&D firm, the American Institutes for Research. We are an interdisciplinary team of linguists, psychologists, instructional researchers, English teachers, writers, and designers. One of our major goals is to bring the results of laboratory research and field testing to the attention of teachers and practitioners. Another is to bring the practical problems of teachers and practitioners to the attention of researchers.

We developed the process model (Figure 1) as a practical tool--a job aid for ourselves and the writers and forms designers we were working with. The Document Design Center's model isn't the only possible way to picture the writing process, but it is a useful one. It has turned out to be useful for analyzing and revising existing documents, for developing new documents, for introducing writers, designers, and students to the notion that writing is a multi-step process, and for seeing the application of research to the practical task of creating useful and understandable documents.

Although the model is drawn as three sequential stages, the writing process is, in fact, cyclical. Research by Hayes and Flower at Carnegie-Mellon University, for example, shows that expert writers work back and forth from planning to writing to revising their plans to writing again. In our workshops and writing projects, we emphasize the iterative nature of the process and students and writers quickly come to perceive that the process is not linear. The linear flowchart, however, helps them to picture the steps.

Most of the steps in our picture of the writing process will be familiar to technical writers and to technical writing teachers. But they are new to many people who write technical, business, legal, and bureaucratic documents. And they will be new to many technical writing students.

Many of the people who write and who design forms in business and government were not trained as writers. Their professional expertise is in the technical field, not in writing or design. They follow traditional formats or model their documents on existing examples. They have never before been led through the five steps in the pre-writing stage of our process model.

Thus, in one study, government attorneys who were asked to revise a regulation made only superficial changes at the word and sentence level. They did not consider whether or not the intended audience could find or understand the information in the regulation. Two companion studies showed that the intended audience, in fact, consistently misinterpreted the headings in the regulation and translated the convoluted, nominal style into narrative in order to understand it.

We have found that many writers on the job are aware of the management process involved in writing—from assignment to draft to review to revision to production. But they don't see the internal process that they as writers and designers have to go through. They don't link the writing process and the management process. For example, they don't realize how long it takes to draft a document nor how to limit how much they will write when they are given only a short time for writing.

Our model is only an outline of the writing process. It is not a course. The writer or writing teacher needs specific techniques for working through each box in the model. Thus, techniques for audience analysis fit into the third box in the pre-writing stage. Guidelines for how to write clearly, simply, and directly are needed to carry out the second stage. Our workshops and the guide that we developed for an advanced composition course fill in the model with examples and specific techniques.

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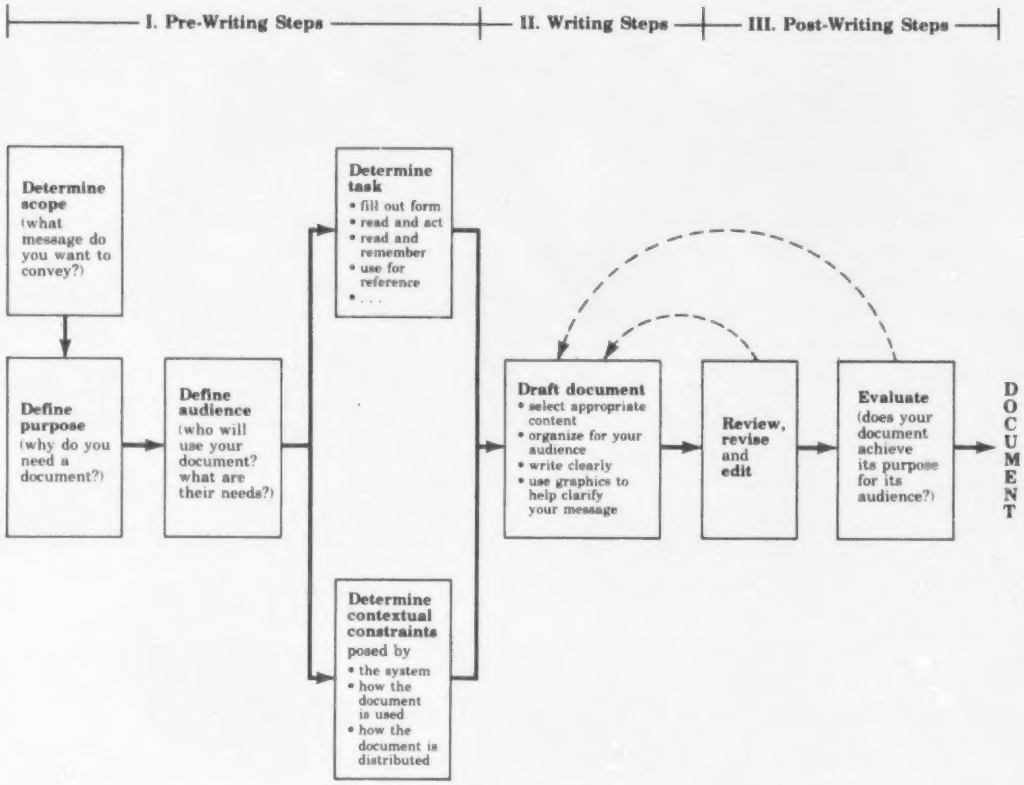
I. Pre-Writing Steps
II. Writing Steps
III. Post-Writing Steps
Determine scope (what message do you want to convey?)
Define purpose (why do you need a document?)
Define audience (who will use your document? what are their needs?)
Determine task
• fill out form
• read and act
• read and remember
• use for reference
• . . .
Determine contextual constraints posed by
• the system
• how the document is used
• how the document is distributed
Draft document
• select appropriate content
• organize for your audience
• write clearly
• use graphics to help clarify your message
Review, revise and edit
Evaluate (does your document achieve its purpose for its audience?)
DOCUMENT

Figure 1. The Document Design Center's Process Model

Let's briefly review the steps in this model.

The Pre-Writing Steps

We ask our clients to consider five sets of questions as they plan their documents.

1. **Scope**—Have a clear idea of the message you want the document to convey. What topics will be included and what will be excluded? What policy decisions need to be made before you can decide what to say? Where will the information come from?

2. **Purpose**—List all of the goals you would like to achieve through this document. We have found that definitions of purpose in terms of classical rhetoric or aims of discourse are not nearly as useful as practical lists of purpose. For example, "I want Mr. Jones to give me a yes or no answer." Or "I want Mr. Jones to agree to this proposal." A sample list of a few of the purposes for a manual might be

- to lower the number of calls from customers for information that is in the book
- to lower the number of requests for service for problems that customers could be taught to handle themselves
- to comply with all Federal and state legal requirements
- to reduce customers' fears about learning to operate and care for the equipment

We find that when writers articulate their purposes in this level of detail, they are better able to select appropriate content and appropriate guidelines for organizing and writing the document.

3. **Audience**—Technical writers are not always attuned to the needs of the end users of their document, especially when the audience is not technically-trained. They assume knowledge that the audience does not have. Technical writers who deal with managers and executives also often have problems because they do not know to present information concisely and sharply for the person who will not read beyond the first paragraph or first page of a memo.

4. **Reader's task**—In discussing purpose, we focus on the writer; in discussing task, we focus on the reader. What will the reader do with the document? Read it quickly and act on it? Read it carefully, take notes, remember what is in it? Scan it now, and come back to it later for a specific piece of information or the answer to a specific question? Many technical reports and business documents are used for reference but are written as if they were narratives to be read once and remembered always. A reference document needs a useful table of contents and informative headings. It needs to be structured to answer readers' questions.

5. **Constraints**—What limits what you can do? If you must accept a constraint, then planning for it saves time, frustration, and money. If you don't want to accept it, then the time to try to change it is here in the planning stage.

The Writing Steps

In the writing steps we draw heavily on research in the relevant disciplines—linguistics, psychology, instructional design, typography, and graphics. Let us give just one example here. In the workshop, we'll present guidelines and research for all of the elements of writing and design. We'll give out bibliographies with references to research articles.

Let's consider one point under the topic "organizing for your audience." Psycholinguistic research has shown that as simple a context as an appropriate heading can make a significant difference in readers' ability to recall the ideas in a passage. Both instructional research and psycholinguistic research have shown that readers understand and learn best when new information is linked to information that they already know. Research also shows that single nouns and noun strings as headings are often misinterpreted.

Therefore, we suggest that writers put headings and subheadings into their texts and that they use full phrases or questions as headings rather than strings of nouns. For example, if you were the reader, which set of headings would you rather see?

EXAMPLE:

Privacy Act Notice
Right to Financial Privacy Act Notice
Criminal Penalties
Notice
Guaranteed Student Loan Program
Terms and Conditions of Loans
Guarantee Fee
Eligible Student Borrowers
Eligible Lenders
Eligible Educational Institutions

What is the guaranteed student loan program?
Who is eligible to apply for a guaranteed student loan?
To whom do I apply for a loan?
How much can I borrow?
How much should I borrow?
What are the terms of a guaranteed student loan?
What will my monthly repayment be after graduation?
When should I apply for a loan?
How do I apply for a guaranteed student loan?

The Post-Writing Steps

1. **Review, revise, and edit**—Extensive technical and managerial reviews are common in most companies, but new writers are often unprepared for the amount of revision they must do. Learning about reviewing means learning how to put a draft aside and then, later, reviewing it oneself. It also means learning interpersonal skills for working with other writers, with lawyers, marketing staff, editors, and others who must pass on a document before it is released.

2. **Evaluation**—For many of the writers we meet, evaluating a document is a totally new concept. Yet a document can be evaluated just as a piece of equipment is evaluated—by trying it out in a laboratory or in the field. Shortcuts like readability formulas give only a very gross estimate of the problems a document might cause. They don't help the writer know what is wrong with the document. They can't be used to judge the relevance or logic of the organization, content, or graphics.

   The true test of a document is whether or not it achieves the purposes the writer listed in the pre-writing stage—and achieves those purposes with the least possible burden on the reader. Note that the purposes that the writer lists at the beginning of the writing process provide clues to appropriate ways to measure the document's success. If Mr. Jones comes back with a yes or no answer, the first writer has been successful. The second writer is successful if Mr. Jones agrees to the proposal. The success of the manual can be measured in part by counting phone calls and service requests.

In the workshop, we'll use the model, present case studies, and draw implications for curriculum and for writing.

ED239269

INVIDIVUALIZED REPORT ASSIGNMENTS VIA COMPUTER

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Criteria for creating report writing assignments for students with mixed interests and expertise in technical matters are presented. Conventional methods of assignment making are evaluated in terms of these criteria, and found wanting. An interactive computer program providing a series of question/response situations allowing students to generate their own data for report scenarios is suggested as an effective method of meeting the criteria. Students query the computer to randomly generate (within limits established by the instructor) the data items they believe necessary to prepare their reports. Finally, the paper examines student reaction to the automated report generation system and outlines plans for further modification and development.

I. THE ASSIGNMENT PROBLEM

I teach technical communication at a university with both a strong commitment to the liberal arts and well-developed programs in natural resources and environmental science. Thus, my students have a wide range of interest and experience in "technical" subject matter. Some are students in the environmental disciplines with good knowledge of technical subject matter and ability and experience in collecting and analyzing data. Others, generally students in English and Communications, are pursuing a progam in technical writing since they see it as an attractive career path; frequently, these students have little previous experience in dealing with technical data. In order to meet the needs of this heterogeneous group, report writing assignments must meet three criteria:

1) They thould reflect real "world of work" conditions as closely as possible;
2) They should allow all students, regardless of their level of technical sophistication, to obtain the data necessary to prepare the report;
3) They should allow each student to work on individual projects.

Any technical communications course should prepare its students to face conditions and assignments they are likely to encounter once they leave the university and begin to apply their skills on the job. While many texts (notably Blicq's *Technically Write!*) attempt to meet this need by providing scenarios for realistic report situations, none is appropriate for our students: they either are too complex for the humanities majors or they focus on disciplinary areas such as engineering which are inappropriate to the post-academic work of students in our College of Natural Resources. We find it necessary to develop assignments to suit our students' special needs.

In order to develop the skills needed to become a technical communciations professional, all students, regardless of their level of technical expertise, must be able to locate and manipulate the kinds of data needed for preparing the standard types of reports. For many of our students this is no problem; course work in their major programs has been excellent preparation. However,, for many whose majors lie outside the technical disciplines, the determination and manipulation of quantitative data is a new experience. While familiar with making and supporting qualitative judgements, the English major is often helpless when facing the need to make a numerical argument; even the task of collecting data is often overwhelming to such students. Thus, some of the assignments, especially those presented in the early stages of the course, must make provision for smoothing the data generation steps. Once the students have developed skill in data presentation, they can go on to methods of locating necessary information on their own. They have learned to ask the right questions.

The ideal assignment would enable the instructor to provide each student with an individual project. Unless they are terribly naive, instructors realize that students discuss assignments with each other. If an entire class is working on the same project, using the same data, word quickly spreads. Thus, as soon as one student discovers that cost factors in a recommendation report assignment result in a negative recommendation, the class is soon aware of this fact; the need to make a decision is removed; the only task becomes effective presentation of that recommendation. Generalized assignments are unrealistic since they lead the student to believe that some "correct" response has been built into the assignment by the instructor; the often uncooperative nature of real-life data does not seem to be present. What is required are assignments that will produce different results for each student, assignments which produce unexpected results.

The challenge is to develop a system of making assignments in the technical writing classroom which meets all three criteria. One method would be to prepare individualized assignments for each student for each report during the term. This, of course, places an impossible burden on both the time and ingenuity of the instructor who assigns a number of reports each term. Alternatively, the instructor can devise a limited number of report assignments to be given to all students. Obviously, criteria 2 and 3 are not met if this procedure is followed. The assignments do not meet the individual needs of students: the projects are either not challenging to the technically experienced student or they are too far over the head of the novice.

What is needed is a method of creating assignments which meet the three criteria without monopolizing instructor time, a way of letting each student create his or her own assignment while still maintaining instructor control over the process.

Traditionally, attempts to do this have involved the drafting of assignment proposals by the students, followed by presentation to, and approval by, the instructor. This method does, in fact, work quite well for the students who can draw on a technical background. Frequently such students are working on suitable projects in their major discipline classes; the instructor of the technical communications class can, often in conjunction with an in-discipline instructor, approve a

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single report (or series of appropriate reports for more involved projects) growing out of other classwork. This approach, however, is of little value in preparing assignments for students with minimal technical background. Generally, such students are not involved in work which would lend itself to the preparation of technical reports. While they may be able to envision a suitable project, in most instances the instructor must create a scenario, and, almost certainly, will find it necessary to provide the student with a supply of data.

II. CRITERIA FOR A SOLUTION

After examining the above options, our technical communications faculty decided to prepare an interactive computer program which would provide a selection of opportunities for students to generate their own data to develop a report scenario. In designing the program we kept several goals in mind:

1) It should be available to students in the most convenient manner possible;
2) It should be very user friendly to accommodate students with limited computer background, in other words, it should acknowledge requests couched in as wide a range of terminology as possible;
3) It should randomly generate, within instructor-established limits, appropriate information for each report situation;
4) It should force students to determine for themselves the type(s) of data they require to complete a report;
5) It should contain a number of alternative subjects for each report situation to respond to various student interests.

In order to provide the greatest flexibility for student access to the assignment program, it was made available through the hard-copy terminal network linked to our Burroughs 6900 mainframe. We did consider the fact that exposure to word processing had familiarized our students with the IBM Personal Computer and Apple II and it might be wise to draw on this familiarity by presenting the assignment program on these microcomputers. However, implementation via the terminals would provide access over the widest possible span of hours and at locations in every academic building on campus; in addition, students would be provided with hard copy of the information generated and the need for laborious hand copying from the CRT would be eliminated.

This decision imposed certain limitations on our choice of programming language: it would have to be interactive, available on our Burroughs 6900, and, perhaps most significantly, within the programming vocabulary of the members of the technical writing staff (as university funding for a programmer from outside the department was not forthcoming). The technical writing staff has facility, to varying degrees, in BASIC, FORTRAN, COBOL, and Pascal. The latter language seemed an ideal choice in terms of easy interactive manipulation but it is currently available on our campus only for the microcomputers; since we could not present a Pascal program via the terminal system, the language was removed from consideration. FORTRAN was rejected since we believe it has obvious limitations both in manipulation of alphabetic characters and interactive capability. (While FORTRAN 77 might have been satisfactory, no member of our staff felt confident in his ability to prepare useful programming using this language.) There was also a notable lack of confidence in our COBOL programming ability. BASIC, despite its limitations, was thus our choice.

III. ASSIGNMENT GENERATION

Frankly, the technical writing staff, in its naivety, was unaware of the magnitude of the task it had set itself; we were not long in reaching such awareness. In order to facilitate implementation of the project, we decided to prepare a program which met only a portion of our criteria and add additional components as both programming time and student feedback became available. We felt that criteria 1 through 4 were essential to an effective evaluation of the project; criteria 5, the range of alternative projects available to the students, was both the least essential to the testing process and the most suitable component for later expansion of the system. We therefore planned and programmed a single report situation--the progress report--and provided only three projects:

1) A forest management scenario designed to appeal to those in natural resource programs;
2) A library acquisitions and facilities expansion scenario for students in humanities; and
3) A municipal bonding feasibility scenario for the social science student.

In no case were students constrained to utilize a particular program because of their major, but generally the scenarios were selected by major interest.

For each scenario we tried to anticipate the types of information that students would find necessary in order to prepare their reports. Data types include size (e.g., area covered in forest evaluation), cost, quantities (e.g., number of citizens polled), and time factors (including factors such as % of task accomplished and expected completion dates.) The data types are listed for the student in a menu presented when initial project choice is made. Initially, we hoped to force the students to determine their own data areas but quickly became convinced that this would require such a massive dictionary to anticipate all possible student terms that the effort was abandoned.

Once a data-type subroutine is entered, the user must ask for the desired information within the category using a key word system. Responding to a cue from the computer, the student enters a self-selected word or phrase. If the program finds the entry in an internal dictionary, it randomly generates the appropriate data within instructor-established limits. If the entered word or phrase is not found in the dictionary, the student is asked to try another. Generally, four attempts have proven adequate to generate the desired data item. At any point, the student may select a new keyword, move to a new data type or exit the program.

This was the most difficult portion of the program to develop and it is the portion that has received the most modification as a result of user evaluations. The programmers tried to anticipate the nature of the information students would request and the vocabulary they would use in making their requests. In both instances, we were not fully successful in our initial assessments. For each of the three scenarios, students asked for additional entries in the data-type menu. In some data types we were very successful in predicting the nature of student requests: our dictionary matched the student entries very completely. In other data areas, we found it necessary to expand the dictionary significantly.

Of course, we could have eliminated the need for a key word dictionary and its accompanying problems of anticipating student word choices by providing a menu of information available within each data type. This, however, would have meant abandoning Goal 4; students would not find it necessary to determine for themselves the specific data items required for a report type. We believe that learning to ask the right questions is an important part of our students' education; we opted for learning over convenience.

Since the same scenarios would ultimately be used for proposals, progress reports, recommendations, and final reports, the instructor-imposed limits on the data allow the generation of unfavorable circumstances. Thus, a student preparing a recommendation cannot know whether the recommendation will be favorable or unfavorable to an anticipated plan of action. To prevent students from rejecting unfavorable data by repeated requests for regeneration of the same data items, the program contains an accounting system which both records the data produced by each student and "locks out" the user from a data item once he/she has received the first response.

IV. EVALUATING STUDENT RESPONSE

We knew that this project would have to be dynamic. A new program such as this would certainly need additions and corrections to make it more user friendly, to better anticipate student needs for information, and to expand its capabilities to provide data for different report forms. In order to guide this dynamic growth, we solicit detailed student evalautions of both the general concept of computer-generated report data and the specifics of implementation. The evaluation process has two components:

1) A "suggestion" subroutine in the program asks for student comment on the data generation session. This contains both specific response items related to the details of the program implementation and an opportunity to record open-ended observations.
2) Written evaluations administered in class after completion of the computer generated report assignment and at the end of the semester ask for student response to the general concept of individual assignment generation.

The program has been used and evaluated during one semester by a class of 26 students, all at the junior and senior level. Nine of the students are majoring in English, five in communications, three in business, and nine in natural resource fields.

As expected, comments on the specific details of the program were almost exclusively devoted to problems in finding a match between information key words and the data type dictionary. As a result of these comments, we enlarged the number of items in these dictionaries by an average of 15%. We believe that even greater expansion would be possible since not every student listed the attempts at key words which did not find a dictionary match. In order to more fully develop the program, we are currently considering adding a routine to the "bookkeeping" portion of the program to record all "unanswerable" questions. Later analysis of these records will allow expansion of the dictionaries and more accurate anticipation of student information needs.

The general comments indicate adequate student acceptance of the basic concept of individual assignment generation to warrant continuation and further program development. Sixteen students (61.5%) approved of the plan, four (15.5%) did not, and six (23.1%) either did not express an opinion or were ambivalent. Those who liked the procedure perceived greater realism in the assignments. Often noted in this respect was the realism created by the uncertainty of randomly generated data; most users felt challenged by this aspect of the program. They also felt that individually generated data minimized interstudent comparisons in the grading process. Finally, there was widespread appreciation of the campus-wide access to the information.

Those who did not like the procedure were primarily enrolled in the natural resources program. Their major objection was to what they believed to be the artificiality of the scenario; they would have oreferred to use material from their personal research. It should be noted that everyone who responded in this was a senior participating in a major research project for another class and they used material from these projects for other reports in the technical communication class. Clearly, they felt that the single computer-generated assignment was an intrusion.

V. CONCLUSIONS

We feel that while our programming of the assignment still needs development, especially through the development of additional scenarios and additional options within scenarios, the program has proven its value. Students generally like the process, and the papers received as a result of this assignment were of quality equal or better to those produced by more conventional assignment methods in other classes.

We anticipate that more and more assignments each semester will be made available through computer generation. In order to meet the objections of those students already working on projects in other areas, we plan to make use of the computer program optional for some assignments.

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EXTERNAL EVALUATION OF STUDENT PROJECTS IN INDUSTRY AND ACADEMIA

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A frequently voiced complaint among technical communication instructors in both industry and academia is that they are required to be or to do too much. Personal experience in the field and documentation from researched sources support the notion that it is virtually impossible for one person to be writer-editor and graphics expert on the one hand, and master of more than one technology on the other. Two case histories illustrate the point that shared or cooperative evalutaion of student work can go a long way toward solving the problem. These histories suggest further that evaluation can be a two-way street: communicators assisting technicians with form, technicians explaining or assessing content for communicators. Frequently all it takes to bring about this felicitous state of affairs, this sharing of knowledge and perception, is the will to break the ice and bridge the two worlds. The long-term benefits of such an effort are better students, more informed readers, and, in general, a thoroughly professional image for technical communication.

WHY ASK?

I think we can all sympathize with two very real complaints carried recently in the pages of *College English*. The first is from David Dobrin of M.I.T.: "At the heart of the continuing difficulties with teaching technical writing is the difficulty of teaching the student to deploy proper conventions for his or her peers in a technical group and the obverse difficulty of judging when he or she has done so correctly."[1] And here is the gloss Ruth Mitchell (of U.C.L.A. and the Rand Corporation) provides for a reproduced list of five typical technical communication positions advertised in the Los Angeles *Times*:

> If we English teachers claim that we train technical writers, then a student leaving our classes should be able to apply for such jobs, on whatever level he or she graduates. But there is no way, unaided by technical personnel, that we could train such a person, because we have no criteria by which to judge such writing in context.[2]

Fortunately, though, even as these two colleagues lament conditions, they provide a clue to a sort of salvation. It is not true salvation, for that is reserved for those instructors who, like Newton and daVinci, are masters of many trades and jacks of a few more. Dobrin asserts the necessity of "penetrating technical groups" to seek "a fusing of the split we have all felt," while Mitchell suggests that we remain in close contact with technicians.
Both these ideas derive from the same truism: one ought not travel difficult terrain alone. The help we get from textbooks and journals goes only so far--into, say, the principles of audience analysis or the necessity of sound document design. Rarely does the printed word go beyond the *conventions* of technical communication and into substance, into the content of the reports our students and fellow workers are likely to generate; not that it should, of course--it is field-specific to a type of communication, not to biochemistry or robotics. The problem comes round again to the impossibility of being all things to all men and women.

At this point of you can begin to guess what sort of remedy I am going to suggest for this sad state of affairs. If you are thinking in terms of the engineering building on campus or the graphics department down the hall, I believe that you are headed in the right direction. I am by no means the first person to suggest the benefits of *cooperative effort* in teaching technical communication; this footnote lists just a few of the discussions in print. The purpose of this paper is to emphasize just how simple and rewarding it can be under the right conditions. Like that first step on a thousand-mile journey, however, it is up to the individual instructor to create those conditions and follow through on them to fruition.

Rather than re-hash some of the principles discussed adequately by my predecessors, I prefer to relate two brief but illuminating case histories, one in a business setting, the other from the halls of academe. Yoked by their connection to computer technology, they both demonstrate the value of cooperative evaluation efforts. I hope that they result in two central perceptions for you: 1, that external evaluation is one of many ways to achieve success in your teaching; and 2, that evaluation can be a two-way street, and the day may come when a technician or scientist asks you to prune the language of a report or examine its graphics for effectiveness.

BEING ASKED

For over a year, Dick L. (Ph.D., American Studies) worked as technical editor for an Atlanta firm that produced software and peripherals with business applications. He occupied most of his time laying out and writing or editing copy for attractive if insubstantial advertising brochures, working with a free-lance graphics consultant and fo the sales manager. Neither of these persons could compose a paragraph of decent English, a disability, he would soon find out, that applied to most of the technology people too.

One day word came down that because of the many clarification-questions that clients were phoning in, whosoever finished a piece of software or perfected a peripheral was responsible for describing its operation and application so that potential buyers could

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be notified by the mailers before the damned thing became obsolete. After a few days of confusion and consternation, Dick found himself teaching (what he wanted to be doing anyway), newly anointed as the "editorial assistant" to any technician whose prose needed taming--and that meant nearly all of them.

Luckily, technical accuracy was less a threat to him than composition and the placement of visuals were to them. Before very long, they had a going operation, based upon the theory that if a write-up was comprehensible to Dick in his quasi-enlightened state, it would be so to any corporate purchaser. If not, he and the technicians would make it right. Upon a foundationstone of friendly cooperation, significant new sales literature was created, sent out, and cited as a cause of an upturn in sales.

ASKING

The time: September, any year. The setting: an introductory technical communiication course. The people: a technical communication instructor and one of the twenty or so students. Let's call her Jan. Let's call him or her you.

You all know Jan. She is the bright young computer-science major who comes to your course not to be reminded of the rules of grammar but to learn what demands might be placed upon her knowledge of communication techniques. Her semester report is going to be on assembly-language generation of three types of high-res graphic display that might accompany scientific data. As her preliminary, she has presented a complex flowchart and an even more convoluted--branches within branches--program listing.

Immediately, like Dobrin, you wonder how you can adequately respond not merely to the format, certainly not the grammar, but to the very content of her report. It is at this point that the irony of Scott Kellner's assertion comes to mind: our "discipline is in a class by itself because of the variety of skills that are called into play."[4] There is no way that the mortal instructor can give fair assessment of the product of a fine young mind. So, armed with the confidence that you are not goldbricking, you telephone an acquaintance of yours in the systems science department.

To make a short story even shorter, you find out soon enough that you have done the right thing. Professor X is more than happy to scrutinize Jan's paper in other areas. Moreover, over coffee one morning he mentions that he would be willing to give a presentation on microcomputers to your techcom class; naturally you accept, even as you consider offering to go over a scholarly paper that you know he is preparing.

Pie-in-the-sky dreaming? Perhaps. But I know of more than one instructor who has worked out schemes similar to this, including yours truly.

GLAD YOU ASKED

In advanced technical communication courses, the possibilities suggested by these case histories increase dramatically. But I hope that you have found in them example and inspiration, a hint of the range of opportunities that the notion of external or shared evaluation might include.

Permit me to conclude with a quotation and a reminder. First the quotation: what Janet Potvin and Robert Woods say about team teaching applies in the same way but on a smaller scale to external evaluation:

> The technical writer provides information on . . . technical writing strategies, report formats, editing and revision, and technical style while the technical specialist relates the concepts taught to industrial situations and evaluates the technical content and organization of the student's written and oral communication . . . a dual approach which provides both of them greater resources.[5]

And the reminder: often, to get the help you need, or even to give help to someone in need, all you have to do is ask.

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SURVEY OF USAGE OF TECHNICAL REPORT COMPONENTS TO ESTABLISH THEIR MOST EFFECTIVE ORGANIZATION

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ABSTRACT

A survey of engineers and scientists at NASA's Langley Research Center (LaRC) and in the academic/industrial communities was conducted to determine the opinions of readers concerning the format (organization) of NASA technical reports and usage of technical report components. A survey questionnaire was sent to 513 LaRC engineers and scientists and 600 engineers and scientists from three (3) professional/technical societies. The survey response rates were 74 percent and 85 percent, respectively. The questionnaire contained 14 questions covering 12 survey topics. The results of two of these survey topics – the order in which users read components (Survey Topic 1) and the components reviewed or read to determine whether to read the entire report (Survey Topic 2) – are presented in this paper.

INTRODUCTION

The National Aeronautics and Space Administration (NASA) and many research and development organizations use the technical report as a primary medium for the communication and dissemination of research results. NASA published 3,399 technical reports in 1980, for example. Six hundred twelve of these reports were published by the Langley Research Center (LaRC).

A survey of engineers and scientists at LaRC and in the academic/industrial communities was conducted to determine the opinions of readers concerning the format (organization) of NASA technical reports and the usage of report components. The questionnaire used for the study also elicited information concerning the usage of scientific and technical information (STI), the perceived image of NASA- and Langley-authored STI, and demographic data about the respondents. The results of this examination were presented in NASA Technical Memorandum 84502 (Pinelli et al., 1982).

RELATED RESEARCH AND LITERATURE

Numerous studies have focused on the percentage of time devoted by engineers and scientists to reading the professional literature as a function of their professional duties. Several studies on the information gathering habits of engineers and scientists have determined the various literature sources used by researchers. Thompson (1970, 1973), as a part of field experiments conducted in three military laboratories, concluded that the addition of a separate, identifiable abstract at the beginning of a journal article or technical report does not increase the ability of the reader to decide what disposition to make of the article or report. He concluded that disposition decisions (read/not read) are apparently based on a variety of cues (e.g., title, table of contents, introduction). In terms of time taken and quality of relevant judgement, these cues are at least as effective as the abstract.

Research regarding how engineers and scientists read technical reports (the order in which report components are read) is limited. What little published literature does exist pertains more to the reading habits and information needs of technical managers than to those of researchers or "bench scientists." In a survey of technical managers in several large engineering enterprises, Turner (1974) found that 87 percent of the technical managers who received technical reports read the summaries, while only 12 percent referred to the main body or text. In his study conducted for Westinghouse Corporation, Souther (1962, 1977) reported that technical managers ranked the conclusion and recommendations as the most important report components in terms of their information needs.

RESEARCH METHODOLOGY AND PROCEDURE

The study used survey research methods to obtain feedback from Langley engineers and scientists assigned to the Aeronautics, Electronics, Structures, and Space Directorates and from engineers and scientists in the academic and industrial communities. Random probabiliby sampling was used to survey the external population. To determine how NASA technical reports were read and to help decrease the likelihood of reconstructed logic, respondents were given a NASA technical report related to their discipline or area of research interest.

The survey questionnaire contained 33 closed-ended questions and three open-ended questions. The open-ended questions were listed on a separate sheet and were included as a supplement to the questionnaire. The closed-ended questions employed the attitude scaling technique developed by Fishbein and Ajzen (1975).

Each question was pre-tested for relevance and clarity on a randomly selected sample of Langley engineers and scientists. The same 26 questions were used to survey both the internal and external populations. Certain of the seven demographic questions were applicable only to one population. The complete methodology for the survey and results for the first 14 questions were presented in NASA Technical Memorandum 84502 (Pinelli et al., 1982).

Weighted average rankings were used to determine the order of use of the 15 report components. The weighted average rankings were obtained by assigning weights based on specific order of use. A weight of 15 was assigned for components read first, 14 for components read second, decreasing sequentially to 1 for components read fifteenth. The weighted ranking was calculated by the formula $\Sigma n_i w_i / n_t$ where n_i was the number of users reading a component in the "ith" position, w_i was the weight assigned for the "ith" position, and n_t was the total number of users who read that component in any position.

Weighted average rankings of order of use were also calculated for the question of which components were reviewed to decide whether to read a report. The same calculation procedure was employed except that the assigned weights ranged from 5 (for read first) decreasing sequentially to 1 (for read fifth).

PRESENTATION OF THE DATA

To determine how NASA technical reports are read, survey respondents were asked to use the NASA technical report provided and to number a list of report components to indicate the chronological sequence in which these components are generally read.

The data collected for this question were used to construct Table A which shows, for each component, the percentages of survey respondents who indicated they read that component at some stage in the use sequence. The report components are listed in Table A in descending frequency of use.

TABLE A

Summary: Percentage of Survey Respondents Who Read Various Report Components

Internal survey (n=378)		External survey (n=504)		Combined surveys (n=882)	
Component	% who read	Component	% who read	Component	% who read
Conclusion	98	Conclusion	96	Conclusion	97
Results and discussion	94	Summary	91	Results and discussion	91
Introduction	89	Results and discussion	90	Summary	87
Description of research procedure	85	Title page	86	Introduction	85
Figures	84	Introduction	82	Title page	82
Summary	81	Figures	76	Figures	79
Title page	78	Description of research procedure	74	Description of research procedure	79
Abstract	71	Abstract	65	Abstract	68
Tables	70	Tables	64	Tables	67
References	63	References	59	References	60
Appendixes	62	Appendixes	55	Appendixes	58
Symbol list and glossary	48	Table of contents	49	Symbol list and glossary	46
Table of contents	41	Symbol list and glossary	44	Table of contents	46
Preface	17	Foreword	21	Foreword	19
Foreword	15	Preface	20	Preface	19

For both internal and external populations, the component read by the highest percentage of readers was the conclusion. Ninety-eight percent of Langley respondents and ninety-six percent of academic/industrial respondents indicated they read the conclusion. Other components read by more than 80 percent of both groups were the results and discussion, the summary, and the introduction.

On the other hand, certain components were read by very few respondents in either survey group. The foreword and preface had very low usage rates. Only 15 to 21 percent of the respondents indicated that they read these components. (With the exception of NASA Conference Publications, Reference Publications, and Special Publications, NASA Technical Papers and Technical Memorandums generally do not include a foreword or preface.) Other components read by less than half of the respondents were the table of contents and the symbol list/glossary.

TABLE B

Weighted Average Ranking: Order in Which Report Components Are Read

Internal survey			External survey			Combined surveys		
Component	n	*	Component	n	*	Component	n	*
Title page	294	14.9	Title page	433	14.9	Title page	727	14.9
Abstract	269	13.2	Summary	457	12.9	Summary	764	12.9
Summary	307	12.9	Abstract	329	12.6	Abstract	598	12.9
Introduction	336	11.6	Introduction	411	11.4	Introduction	747	11.5
Table of contents	155	10.9	Table of contents	247	11.1	Table of contents	402	11.0
Conclusion	371	10.4	Conclusion	485	10.3	Conclusion	856	10.4
Foreword	58	9.9	Foreword	108	9.7	Foreword	166	9.8
Results and discussion	355	9.6	Results and discussion	452	9.7	Results and discussion	807	9.6
Description of research procedure	323	9.5	Description of research procedure	375	9.2	Description of research procedure	698	9.4
Preface	63	9.2	Figures	382	8.5	Preface	164	8.8
Figures	319	8.4	Preface	101	8.5	Figures	701	8.5
Symbol list & glossary	181	7.9	Tables	324	7.3	Symbol list & glossary	404	7.5
Tables	264	7.2	Symbol list & glossary	223	7.2	Tables	588	7.3
References	237	6.1	References	295	6.5	References	532	6.3
Appendixes	235	6.0	Appendixes	277	5.6	Appendixes	512	5.8

*Weighted avg. rank – Highest number indicates component was read first; lowest number indicates component was read last

To clarify sequence of use of report components, a weighted average ranking was calculated and is presented in Table B. When both surveys were combined, the resulting mean sequence for the first six components read was the title page, summary, abstract, introduction, table of contents, and conclusion. When examined separately, the internal and external survey groups showed very similar overall use patterns with a few narrow variations in sequential positions. For example, while both surveys groups read the title page first, internal respondents indicated they read the abstract second and the summary third; whereas, external respondents read the summary second and the abstract third. Both groups named the references and appendixes as last in their reading sequences.

Although the abstract appears on the last page of NASA reports, this component was read by a clear majority of users (71 percent internally and 65 percent externally). Moreover, the abstract was most commonly the second or third report component read by users.

The respondents were asked to indicate which components (up to five) were used to decide whether to read the report. Respondents were asked to indicate the order in which these components were read.

Table C lists the five components most frequently used by survey respondents in reviewing reports for possible reading and the percentage use by each group. Respondents from both groups indicated the summary, conclusion, abstract, title page, and introduction (listed in decreasing frequency of use) as the components most often reviewed to determine if a report would actually be read. The summary was the component utilized by the highest percentage of survey respondents as a screening tool. Sixty-nine percent of the internal and seventy-seven percent of the external respondents indicated that the summary was used as one of the screeing components.

TABLE C

Components Most Commonly Used to Review/Read Reports

Component	Percentage of respondents indicating use of a report component		
	Internal survey n = 378	External survey n = 504	Combined surveys n = 882
Summary	69	77	74
Conclusion	67	58	62
Abstract	63	57	60
Title page	48	57	53
Introduction	47	37	41

Table D gives a weighted average ranking for order of use of the five components most frequently reviewed in deciding whether to read a report. This table shows that the most common sequence used by the combined surveys was: title page, abstract, summary, introduction, and conclusion. The use pattern for both internal and external groups was the same as that for the combined surveys except that the internal users read the conclusion (fourth position) before the introduction (fifth position).

TABLE D

Weighted Average Ranking: Order in Which Components are Reviewed in Deciding Whether to Read a Report

Internal survey			External survey			Combined surveys		
Component	n	*	Component	n	*	Component	n	*
Title page	181	4.99	Title page	287	4.95	Title page	468	4.97
Abstract	239	4.40	Abstract	288	4.17	Abstract	527	4.28
Summary	260	3.83	Summary	388	3.68	Summary	648	3.74
Conclusion	254	2.82	Introduction	187	2.81	Introduction	363	2.73
Introduction	176	2.65	Conclusion	293	2.54	Conclusion	547	2.67

* Weighted avg. rank – Highest number indicates component was read first; lowest number indicates component was read last

CONCLUSION

Survey Topic 1: Order in Which Users Read or Review Report Components

The conclusion was the component read by the highest percentage of both survey groups (98 percent internally and 96 percent externally). The preface and foreword were read by very few respondents. These components are seldom used in NASA technical papers and NASA technical memorandums. These two report categories constitute the bulk of the Agency's report literature.

In the combined survey groups, the most common reading sequence for the first six components was the title page, summary, abstract, introduction, table of contents, and conclusion. Although the abstract appears on the last page of NASA reports as part of the COSATI page, a plurality of Langley respondents and a substantial minority of external respondents read the abstract second, after the title page. Thus, the abstract was shown to be important to the respondents, as evidenced by the high percentages of both survey groups which read this component at some point in the use sequence (71 percent internally; 65 percent externally) and by the prominence of the abstract's position in the sequence of use (usually the second or third component read). One possible explanation for the higher use by LaRC respondents is that more internal personnel are familiar with the NASA report format. Some external respondents may not be aware that NASA reports contain an abstract and where it is located in the report.

Survey Topic 2: Components Reviewed or Read to Determine Whether to Read the Full Report

Respondents in the combined survey groups indicated the title page, abstract, summary, introduction, and conclusion as the most common sequence of reviewing components to determine if a report would actually be read. As with the data produced by Thompson, no one component appears to be used exclusively to make that decision. The summary, conclusion, and abstract were used most frequently as screening tools. One or more of these components may be the only ones read; therefore, it is important that each of these sections be written so that it can be read and understood independently of the rest of the report. Further, the reading of the entire report may depend on the ability of one or more of these components to hold the reader's interest. Particular attention should be directed toward the summary because it was the component utilized as a screening tool by the highest percentage of respondents in both survey groups.

CONCLUDING REMARKS

The survey results produced empirical data regarding the components used in the screening process to decide whether to read a technical report in full and the components actually read in the reading process. As shown below, four components (the conclusion, summary, introduction, and title page) were among the five most frequently used components in both the screening and reading processes.

Percentage of Respondents Indicating Use of a Report Component

Screening process		Actual reading	
Summary	74	Conclusion	97
Conclusion	62	Results and discussion	91
Abstract	60	Summary	87
Title page	53	Introduction	85
Introduction	41		

A weighted average ranking was calculated to establish the sequence (order of use) for both the screening process and the actual reading of technical reports. As shown below, four components (the title page, abstract, summary, and introduction) were common to the first five items in both sequences, with two components (the title page and introduction) occupying the same positions in both reading sequences. It is significant to note that although the summary was the component used most often by survey respondents in the screening process, it was read third in terms of the sequence of the five components used in the decision process. Further, although the conclusion was the component read by the highest percentage of both survey groups, it was not one of the first five components read in the actual reading sequence.

Weighted Average Ranking for the Combined Surveys

Screening process	n	*	Actual reading	n	*
Title page	468	4.97	Title page	727	14.9
Abstract	527	4.28	Summary	764	12.9
Summary	648	3.74	Abstract	598	12.9
Introduction	363	2.73	Introduction	747	11.5
Conclusion	547	2.67	Table of contents	402	11.0

*Weighted avg. rank – Highest number indicates component was read first; lowest number indicates component was read last.

In the combined surveys, the most common reading sequence for the first five components was the title page, summary, abstract, introduction, and table of contents. The first five components in the prescribed format for NASA technical reports are title page, foreword/preface, table of contents, summary, and introduction. Based on the survey results, it would appear that how a NASA technical report is written (the sequence or order of the components in the prescribed format) may differ from how a NASA technical report is read.

The results of this survey provide empirical data as to the reading habits of engineers and scientists. These data may be useful to authors, editors, and publishers of technical reports and of textbooks, style manuals, and publications guides on technical writing and editing. It is an important principle of communication that the intended audience of any written or verbal message should be identified, considered, and "targeted" in formulating and presenting that message. This principle applies to the technical report medium as well as to other media. Because NASA is mandated to provide the widest possible and appropriate dissemination of the results of its research efforts, it is important that the Agency's report format facilitate communication.

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TWO CHARACTERS AND A CROWD IN SEARCH OF AN AUTHOR

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"Invoking the Muse of Technical Writing"
—*Technical Communications* (1973)
"How a Computer Should Talk to People"
—*IBM Systems Journal* (1982)

Writers say they don't know enough about the crowd of their potential readers. But there is one reader they can know intimately, and must know if they are to write effectively. That reader is the one the writer creates. A text implicitly requires each real reader to play the part of this made-up reader. *How well real readers can play the part depends a lot on another part implicit in a text: the* implied author, *the mask that the real author projects. Writers can better reach the crowd of their real readers if, from the moment they start to think about writing, they pay attention to their made-up reader, their implied author, and the relationship between them.*

THE CROWD OF REAL READERS

In their book, *The Reader over Your Shoulder,* Robert Graves and Alan Hodge suggest that whenever writers sit down to write they should imagine a crowd of their prospective readers looking over their shoulder.

Well, then. Who *are* you? (To simplify matters, let's not talk about the whole crowd of you, but just you there, individual you.) I certainly don't know *who* you are. I don't know your name, your sex, your age, where you live. I don't know what you like to read, or even whether you like to read in the first place.

How could I know any of these things?

I can't, of course. Not even if you got in touch with me at this point and said, "See here, I'm B. J. O'Connor, thirty-six years old next month, and I live in Chapel Hill. I like to read *earnest* conference papers; don't joke around with me," then announced, "I'm going to read your piece, starting again at the top." Even if you did that, I still don't know those things about you *now, as I write.* And it's lone you that we're talking about. What about the rest of the crowd? The very thought of a crowd puts my heart atremble. If I can't imagine who *you* are, how am I going to imagine a crowd of you?

Writers *just don't know* who their real readers are—they write for an indeterminate crowd. Yet writers continue to say that they wish they knew more about their real readers. For example, writers ask, "What is the readers' reading level?" Never mind that the term "reading level" is practically meaningless for even *one reader,* let alone a far-flung, disparate *crowd of readers* from different school districts at different times, with diverging interests and reading habits.

Yet there's *something* to the suggestion to imagine a crowd of prospective readers looking over your shoulder. In my work as an editor, I frequently find myself penciling onto a writer's draft, "Readers will probably have to read this sentence several times," or "Won't readers wonder why you're telling them this?" In fact, as I see it, my main job as an editor is to try to *be the reader.*

But which reader?

THE MADE-UP READER

In another paper for this conference, "Make Your Reader the Hero of Your How-to Story," a fictional character, Uncle Moe, reflects that a real person portrayed in nonfiction is no more real to readers than a fictional person, insofar as readers know both only through the writing. Then he realizes that the writer is in a similar situation: "We don't know all those strangers out there who are going to read our story." He has discovered that "even the reader is a fiction"!

This idea is not new. Henry James, perhaps first, said that authors make their readers, just as they make their characters. Chaim Perelman in 1952 wrote that "the universal audience. . .is an ideal audience, a product of the author's imagination."(1)

Walter J. Ong emphasized this point by titling a recent essay, "The Writer's Audience Is Always a Fiction."(2) Ong seemed serious about that "always": not only is the "universal audience" a fiction (a sort of generalized crowd), but so also is a friend to whom one writes a letter. We may write a breast-beating letter to a friend, expecting the friend to be a sympathetic reader. How disappointed we are when our friend refuses to indulge us by playing that role!

A piece of writing requires that real readers play a role, but real readers may not want to play it or be able to play it. I think that real readers can get into a piece of writing, not so much because they can identify with the "characters in the story" (as Uncle Moe says), but because they can identify with the *made-up reader* and feel comfortable playing that role.

But, in concrete terms, what *is* a "made-up reader"? Who, for example, is the made-up reader of "Make Your Reader the Hero"? Clearly a sort of bystander who somehow has come into possession of the letters between Uncle Moe and his niece Merryade. This bystander is not innocent, however, but has an interest in the unusual analogy between how-to writing and fiction and would like to apply the information, perhaps as Merryade does. Real readers who can't or aren't willing to play this role won't finish the piece; its human interest is too limited for readers seeking a good yarn.

One of the first real readers of "Make Your Reader the Hero" reported that he couldn't get into it because it required him to snoop into a private correspondence. Snooping embarrassed him; he was too uncomfortable to continue reading. (But Uncle Moe may be right that readers should be able to identify with the characters, because another male reader reported that he felt ill at ease trying to identify with Merryade, a female. He could have identified readily with, say, nephew Rademyer—who, I assume, would have put off some female readers.)

An extreme example of how the role of the made-up reader can trouble real readers is hard-core pornography. True, one can read hard-core smut for a haughty laugh, but to read it earnestly as it was intended to be read, one has to get a bit smutty around the gills oneself. Otherwise, one won't be able to play the part.

Or, take advertising. "Much of the force of modern advertising comes from the writer's skill in defining a particular set of ideal characteristics with which the confused real reader may be expected to desire identification."(3)

The author of that observation, Walker Gibson, put the issue succinctly fifteen years earlier when he said that writing often fails simply because in its "mock reader we discover a person we refuse to become, a mask we refuse to put on, a role we will not play."(4) It is by that refusal that, "in the case of advertising . . .we keep our money in our pockets"!

The Made-up Reader of Technical Writing

The idea of the made-up reader has practical value for writers, editors, educators, and researchers in improving technical communication. For example, we agree that editors should not edit something as *they* would write it. Similarly, they should not impose on a writer their own idiosyncrasies as real readers, but should try to identify what reader the writer has made up, so they can help the writer make sure that that reader's part is coherent and adequately motivated. Then the editor can evaluate how willing and how able the crowd of real readers are likely to be to play that part. Editors and writers should try to pinpoint where real readers are likely to be in the dark or confused or misled about the part, because real readers need to know what reader they are expected to be.

Harold Ross was notorious for marking "Who he?" on manuscripts for *The New Yorker*. Every editor has come across unfamiliar information in a writer's draft, not just unfamiliar to the editor, but probably unfamiliar to most potential readers. The writer has, consciously or unconsciously, made up a reader who knows the information, or who will look it up.

So, when I pencil on a writer's draft, "Will readers know this term?" I am pointing out that the writer seems to assume that the made-up reader knows the term. But, I am suggesting, few readers in the crowd *can be* such a reader—without, perhaps, looking up the term—and most readers *will be unwilling* or at best reluctant to do what is necessary to become such a reader. How much the made-up reader knows about the subject matter is crucial, especially in technical writing.

Another common problem in technical writing is what Ernst Jacobi calls "the myth of the captive reader." Writers assume that their reader *must* read what they write, and consequently take that reader for granted. As Jacobi admits, captive readers *do* exist, but on "every level you can see captive readers rebelling by erecting barricades of indifference and boredom. To breach these walls you have to enlist their interest. You have to treat them as equal partners in the two-way enterprise of communicating."(5)

Every editor has edited writing that depends on the made-up reader's having more interest in the subject than real readers are likely to have. The writer hasn't attempted to motivate the made-up reader, who is expected to be sufficiently interested in the material to keep reading almost any kind of presentation.

The writer without a sense of the made-up reader's motivation usually produces "writing," not "reading." And the writer who tries to write for the crowd must continually resolve potential contradictions among diverse real readers—or *real* contradictions, as when reviewers' comments come in after a draft review. In this situation, the writer's only sane response to the inevitable differences of opinion is to resolve them in favor of one reader, the made-up reader.

The writer who starts out with a coherent made-up reader in mind (and *some* idea of the crowd) has a reliable guide for selecting, organizing, introducing, emphasizing, and subordinating information. That writer is more likely to create a made-up reader whose part real readers can and will play.

The writer may even create a made-up reader that real readers will *enjoy* playing. What a triumph! The editor will wish to know the writer's secret. Where I work there are three or four technical writers who seem to have a secret. They write with an elusive magic; when I play the role of their made-up reader I feel *good*. These writers seem more than simply aware that they are writing to be read: they seem to be aware of who is doing the reading. I know that one of these writers deliberately makes up his reader; for example, a doctor working in a hospital, who is busy with important matters and thus wants to know without elaborate inference exactly what to do, and who will quit reading if the text doesn't deliver the goods.

Because the paper you are reading is about the made-up reader, you may be wondering what sort of reader the paper's author thinks he has made up.

The Made-up Reader Speaks for H--self

Yes, I was wondering. But, whew!—third person is awkward for referring to myself, because I'm neuter. Rather, my sex is indeterminate. (Oh, could that be misinterpreted?) I hope my part is easy to play for Betty Jane or Billy Joe, whoever B. J. O'Connor, of Chapel Hill, may be.

I'm reading this piece because I seek insights into improving technical communication. I like seminal ideas that I can develop for myself, as well as specific tips and techniques.

I like to read! *I've heard of Robert Graves (but not Alan Hodge). Though I haven't read* The Reader over Your Shoulder, *I can imagine the sort of book it is, and I have read a dozen books like that. Oh, I saw "I, Claudius" on television and loved it, especially the scene where. . .but let's not go into that.*

Of course, I prefer to know every word and allusion I come across, but I realize that if I never have to go to a reference book, I'm probably stagnating. And, because I read a lot, I easily tire of the same old thing hashed over. I like an author who seeks fresh ideas and interesting ways to put them.

THE IMPLIED AUTHOR —THE REAL AUTHOR'S MASK

Unlike the idea of the made-up reader, the idea of the *implied author* may seem obvious: of course readers form an impression of the author! Though most technical writing is done anonymously as regards the real author (or authors), readers gain through reading a sense of a person speaking the words. Walker Gibson points out that even though the writer is not physically present to readers, readers respond to the writer's words much as they respond in a social situation—they infer a personality.

But this personality only faintly resembles that of the real writer (if it is accurate at all), because readers have only the evidence of the printed page. For example, we think of comedians as funny people. But of the late Marty Feldman, Dudley Moore said: "There was a very serious side to him, as in the case of every comedian." The comic personality is the real person's mask; the implied author is the real author's mask.

Is there a *best mask* for "technical writing," which all writers should try to project? I hope not. I hope every technical writer has to create his or her own mask. But I think it is true that real readers don't fare well with an implied author who is uninformed, stuffy, or condescending; I think they do better with an implied author who knows the subject thoroughly, talks about it without airs, and has a respectful relationship with the made-up reader.

Have you noticed that we tend to like and respect people who like and respect *us?* Human relations. In writing, it is the relationship between the implied author and the made-up reader. Real readers wish to play the part of a made-up reader whom the implied author likes and respects. I like to read the writer I mentioned earlier—the one who imagined a doctor as his reader—because his implied author seems to know and like me.

More than that. This writer consistently creates an implied author of wit and intelligence, an author who knows not only whom he's talking *to*, but what he's talking *about*. Being this implied author's made-up reader, I feel myself in competent hands. He seems to anticipate my response; we seem to follow each other. For example, this is from a user's guide by this writer:

> Perhaps you have already flipped through this book to look at the pictures. That's a good way to start. With a little luck, one of the pictures looks like something you want to create. If so, you know exactly where you want to go. This chapter will try to get you there quickly.
>
> If you found a likely picture, you probably found near it a set of statements that you thought might create it. If you tried to modify those statements to produce exactly what you wanted, you were probably frustrated. Even if you tried to execute just what appears in the book, you might not have been pleased with the result. A few explanations might be needed.

This implied author *knows* me. (That is, he's aware of the part he has prepared for me to play, and I recognize the part.) But he's light-handed; he doesn't gloat over it. (Maybe I *haven't* flipped through the book—but I've just received a subtle hint that it might not be a bad idea.) And he has also subtly told me why he's about to explain something to me—not because he's a hotshot, but because a few explanations will save me frustration.

This writer always writes accurately, thoroughly, clearly, simply. But what distinguishes his writing in terms of the relationship between the implied author and the made-up reader is his *tone*. Cleanth Brooks and Robert Penn Warren understand how important tone is: "Tone, indeed, represents a kind of final integration of all the elements that go into a piece of writing. Writing that is toneless or confused in tone is usually bad writing."(6)

Like tone, *voice* is a sort of final integration. In writing this paper, I struggled through a time of uncertainty, which I thought of as "trying to find my voice." I believe that I was seeking a comfortable mask, an implied author appropriate to the subject and to the reader I was trying to create.

Indeed, for Brooks and Warren, tone is essentially the implied author's attitude toward the subject and toward the reader. If real readers can always infer a personality behind the words they read, then "toneless writing" is impossible. The person behind such writing will seem bored, uninterested in the reader and perhaps in the subject, and probably stuffy.

It is an art to project an implied author and create a made-up reader that together produce a good tone. In a classroom, the teacher can help students learn the art by providing exercises that require them to create alternative authors and readers.

Writers can develop the art by consciously making up the reader and the author when they write. An editor can help them evaluate how well they have done. And they can help themselves by discovering other writers whose made-up readers and implied authors work well, then rereading those writers to see how they did it.

The Implied Author Describes Himself

I made up the reader without consulting you, real reader, whereas to figure out who I am you had to consult the evidence on these pages. Since you were at a disadvantage, it's only fair that I tell you who I think I am.

Though I quoted a few "authorities," I was not trying to overpower you. I used everyday examples and illustrated myself and my counterpart, the made-up reader, to appeal to your own common, critical sense.

I believe that writing is an art, and I have suggested that I am skeptical of pseudo-scientific paraphernalia like readability formulas. I don't think they help us much in improving technical communication; they probably distract us from more important matters. For example, I believe that we have much to learn from literary criticism. After all, that's where the ideas of the made-up reader and the implied author come from.

I am playful and I like to write. *I certainly had fun writing this paper. I expected you to have fun too—if you could get into the part.*

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GENERAL SEMANTICS: KEY PRINCIPLES THAT OPEN OR SHUT COMMUNICATION DOORS

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If you write, edit, or read (which includes most people) you need to be aware of the principles of General Semantics, which is not to be confused with semantics, and how these principles affect you in the mentioned activities. Terms and principles of general semantics will be identified and applications made to the processes of writing, editing, and reading. Those who attend this workshop will be invited to participate in short exercises that illustrate and reinforce the principles. Open discussion and examples from attendees will be encouraged.

GENERAL OUTLINE OF WORKSHOP

A. Defining General Semantics (GS)

Basically, GS concerns the way people respond to (not simply define or understand) words, symbols, and perceptions. When we understand how personal meanings are generated, we are on the way to being better equipped to use words to represent those meanings (as writers or editors) or to interpret the words of others (as readers).

B. How meaning is assigned and transmitted

A model will be used to show how meanings are formed--and how each aspect of this formative process is unique with the individual. Areas of difficulty in the communication process will be related to the components of the model and possible remedies for problems will be suggested.

Briefly, our five senses limit us to incomplete and imperfect information about any event or environment. That which we do sense is then processed by us as individuals--with unique backgrounds and abilities--with the result that meanings we assign as individuals often vary. The meaning we assign is our personal "map" of the complete and complex event that we sensed.

When we write we are attempting to accurately describe our map to others.

C. Discussion of terms and traits of GS

Terms used in GS refer to characteristics of how we perceive and process information. These characteristics are easily recognized but are often overlooked until an awareness of their importance is emphasised. Some of the concepts to be discussed are:

.. Abstracting. We "abstract" only a small part of the total information available. Why, and what difference does it make?

.. Non-allness. Every event is so complex that one can never know everything about it. How is writing and reading affected?

.. Non-identity. No two events are identical in every detail. What then constitutes a "significant difference"?

.. "The map and the territory." We "map" each event, object, or person based on our perceptions and assigned meaning. But, how well does our map describe the actual "territory," or actual item? What problems can arise when poor maps are used?

.. Inferential statements. The line between fact and inference is very important in communication, but it is often forgotten or not clearly recognized. What happens when inferences are taken as facts?

.. Polarized thinking. Words or symbols can induce undue positive or negative meanings, feelings, or behaviors. How can one minimize personal problems with polarized thinking?

.. Subscripting. There are several ways to differentiate between nearly identical items. How can we use these methods to reduce confusion of meaning and improper equating of items with important differences?

D. What GS principles can do for writers, editors, and readers

Reflecting on the principles of general semantics and how they apply to a present communication situation can make the communicator aware of previously unrealized possibilities and pitfalls. The writer needs to be careful when putting a "map" into words; the editor can be helpful in evaluating and clarifying the meaning transmitted; the reader must try to determine the writer's meaning rather than assigning a personal meaning.

The workshop will be presented via projected aids that present main points, examples, and illustrations. This entire workshop is meant to be both practical and participative.

FROM INFORMATION SCIENCE: AN OPERATIONAL DEFINITION FOR COMMUNICATION

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Post-doctoral studies in the structure and communication of technical concepts

ABSTRACT

A technical field requires that its concepts are defined in terms of explicit operations. The set of defining operations for a given concept will generate all instances of that concept. These operations meet the criteria for objectivity and will produce the same results when carried out by various practitioners in the discipline. Levels of precision for the results must also be defined operationally. The defining operations for a concept provide an objective test for confirming that the concept has been communicated. The operations of transmitting, and then testing to confirm that the receiving system now has the concept, serve to define the concept of communication operationally.

In professional activities for business and classrooms, technical communicators need a means of confirming that technical information has been transferred as intended. If communication consists of transferring information[1] from one system[2] to another, we do not have a valid claim that communication has occurred until we can produce evidence that the receiving system has the intended information which was not present before the transmission. An operational definition for communication not only meets this need, but also validates the title "technical communication."

The main focus of this paper is neither theory nor philosophy. It is description. What I want to describe are objectively confirmable operations. As you decode the symbols on these pages, you are constructing your meanings relative to the associations you hold for the words you read. Without dialogue, however, without some interaction through which we confirm that your interpretations of what you read here correspond with the meanings I want to transfer to you, we cannot claim communication. All that I can claim is that I am using this paper as the only medium presently available to me, the writer, for transmitting my message to you, the reader. In this message, I am trying to describe for you some examples of operations through which you can demonstrate for yourself how a specified set of operations defines communication.

Now, let's consider how operational definitions provide
1) the structure of a discipline,
2) the tests for confirming transfer of information, and
3) a generalized operation of transmitting and testing which defines communication.

A significant feature of technical and scientific fields, called "disciplines," is that concepts constructed in those fields are given precise meanings relative to explicit operations. These operations are fundamental to the development of a discipline because, in order to ask answerable questions and to pose testable hypotheses, we must formulate our questions and hypotheses in terms of operations. Furthermore, in order to confirm that two or more individuals hold the same concept, that concept must be defined operationally. An operational definition is explicitly those manipulations which generate, select, or construct all specific instances of that which is defined.[3] It is essential to avoid thinking of a definition as a statement, even when the statement prescribes in detail the operations to be performed. The statement is neither sufficient nor necessary to produce a specific instance of what is to be defined, while the operations are both necessary and sufficient to produce all knowable instances; that is, to define.[4]

Explicit requirements for an operational definition are that it be objective, demonstrable, and reproducible. Meanings for these requirements are referenced to operational criteria[5] as follows:

1) The criterion for objectivity is that the operations and results are confirmable by a population of independent observers.
2) The criterion for demonstrability is that the operations are observable on demand.
3) The criterion for reproducibility is that observers can become consistently successful in performing corresponding operations to produce corresponding results.

By defining concepts with objective, demonstrable, and reproducible operations, a field of study attains the structure required for its development as a discipline.[6] Each definition is a structure of operational relationships among demonstrable elements. Furthermore, the relationships within hierarchies of concepts so defined are also demonstrable. For example, higher order technical concepts may be constructed relative to operational relationships among concepts at a lower level of abstraction.

Let's look at some more operational definitions which illustrate structural relationships among concepts as well as how the test for confirmation works.

The operational definition of *velocity*, for example, is prescribed by

$\vec{V} \equiv \frac{\vec{r}_2 - \vec{r}_1}{t_2 - t_1}$, where $\vec{r}_2 - \vec{r}_1$ is a measurement of displacement between events 1 and 2, and $t_2 - t_1$ is a measurement of the time interval between these same events. *Time* is defined by the operation of comparing the intervals between events with the intervals between standard events generated by a clock. *Displacement* is defined by the operation of measuring along the path of a light ray the interval between events 1 and 2 in standard units of the meter. The relationship between these two concepts, time and displacement, which are defined operationally at one level, establishes the operations which define *velocity* at a higher comprehensional level.

To confirm that this technical information has been transferred, that is, that the concepts have been communicated to a particular audience as intended, we need empirical evidence that the individual can take the appropriate measurements and perform the appropriate calculation for a specified situation. One way to attain this evidence is to present the individual (the receiving system) with a set of situations through which the evidence can be demonstrated. Suppose one of the situations is stated as follows:

> An object starts moving at point P on a circular track that has a circumference of 60 feet and stops at the same point P after one round trip with elapsed time of 60 seconds. What was the object's velocity?

If the receiving system performs a calculation and responds "The velocity is 1 foot per second," the sending system has evidence that the information about the vector quantity called "velocity" has *not* been transferred to the receiving system. Possibly the receiver has missed the operation which defines the vector of displacement. After reviewing this operation, the receiver may look at the stated situation again and respond, "The displacement is zero, and so the velocity is zero."

One correct response to such situations is not sufficient evidence that the technical concept is now held by the receiver. Often several varied tests are needed to consolidate the concept for the receiver and then several more for confirming communication. When the receiver is giving correct responses consistently as a series of tests is presented, the evidence is stronger.

This testing for convergence of meaning can be carried to any criterion level of rigor. For example, nine correct demonstrations out of ten independent trials suggest a .9 probability that the concept of velocity has been communicated as intended. Thereafter, the individuals who participated will use the term "velocity" to refer to the end result of the operations through which all specific instances of velocity are generated.

For the next example, let's use a concept which is called "density." The word "density" is used frequently without a quantified reference. We can speak of the density of population in urban areas, the density of fibers in a cord, and the density of components on a circuit board. When references are provided for these examples, we can make quantified statements. We can count people per square mile and state the result of that operation as population density for one community. Because the specified operation can be performed by others with the same result, the statement is confirmable and anyone can demonstrate the meaning for that statement.

The word "density" is also used to refer to the result of the operation of measuring the weight of a steel ball bearing, for example, and dividing that weight by the volume of the sphere. Notice that this example also illustrates the construction of an operational relationship (ratio) between two concepts which are operationally defined at another level. *Volume* is defined by the operation of comparing each of three dimensions of an object with a linear standard such as meter, and multiplying the measurements. *Weight* is defined by the operation of balancing that object with some weights calibrated to a standard such as kilogram.

The test for confirming that this concept of density has been communicated is that the receiving system consistently performs the same operations and attains the same results. Standardizing the units of measurement makes it possible for individuals to have confidence that the symbolic representation of their descriptions will have the same reference. When a sender specifies English units and the receiver only has access to instruments calibrated for metric standards, the receiver knows to make the appropriate transformations in order to attain the same results.

Criteria for precision of results can be specified for any operation. In this example, those criteria may be the specifications for measurement to the nearest millimeter and milligram. Higher precision requirements may call for measurement to within 1 part in 10^8, which would indicate that carefully controlled laboratory conditions are necessary for the measurements. An important point is that the meaning for "precision" also is constructed relative to operational criteria.

As a example of distinctions between technical and natural language definitions, consider the current controversy over a standard definition for *life*. Some groups advocate defining *life* operationally by applying a specified criterion derived from brain-wave measurements. Others advocate defining *life* operationally relative to measurements of heart and lung activity. Either of these operations provides a way for all observers to agree on any particular instance of life. In contrast, natural language definitions of life are related to properties reflecting personal and cultural preferences and ideals.[7] However valuable such ideals may be to any individual or group, they do not provide a criterion for objective agreement in a specific situation to answer the question, "Is life present in this body?"

After considering how a specific structure of operations in each of these examples provides a test for confirming that the information related to that structure has been transferred to the receiver, we must move into another comprehensional level to consider the generalized operation of testing. Individually and collectively, these tests can confirm that information has been transferred. By employing such tests when it is necessary to confirm that the receiver now holds the intended information, we attain empirical evidence that communication has taken place.

Technically, then, communication is defined by the operations of transmitting a message and then testing and confirming to a desired criterion level that information has been transferred as intended. With such an operational definition, technical communicators can ask answerable questions and construct testable hypotheses about communication.

NOTES

1. An operational definition of information involves calculating the change in the state of knowledge of a system. The calculations are based on probabilities that a given signal will be processed to result in a specific decision, such as a simple yes/no. Readers who desire a change in their states of knowledge relative to this subject may refer to Stanford Goldman, Information Theory, New York: Dover Publications, 1953.

2. Systems which process information may be computers, puppy dogs, or human brains.

3. An essential distinction of technical language is that convergence of meanings relative to an operational definition assures that the individuals employing those definitions will also agree on each instance or example of that which is operationally defined. Conversely, individuals who discuss their natural language meanings for concepts such as those named with the terms "causation" and "knowledge" may agree readily on words used to described their general meanings and yet disagree, sometimes with great violence, on particular instances or examples. As an example of how such discrepancies can be assessed, copy the list provided as an appendix and see how you and a friend differ in the specific instances each of you holds for such familiar concepts as those named with the words "animal," "language," "fruit," and "disease."

4. The sentences referenced to this note, for example, tell what we must do (and not do) in order to define something technically. Stated another way, and at another level, the activity of employing operations is the operation which defines definition.

5. Notice that the operation of applying a criterion such as one of these meets the requirements of this set of criteria. Thus, by applying the criterion for objectivity, we define objectivity operationally, and our operational definition is objective, demonstrable, and reproducible.

6. The term discipline seems appropriate for those fields of study which require that the products of imagination, intuition, creativity, or any of the subjective activities, be incorporated into the structure only after having been tested relative to experience and found to be consistent with experience. Notice that it is not required that a newly tested hypothesis be consistent with the existing structure. Indeed, the most exciting new ideas in any discipline are those which result in a restructuring to accommodate them. Of special significance is the complementarity of the intuitive and deductive modes of activity which generate, respectively, the hypothesis and the test. Without the intuitive and creative activity, we have no new hypotheses to test. Without deduction and testing, we have no way to extend a theoretical structure with communicable concepts.

7. In P. W. Bridgman's essay on operationalism he discusses the advantage of defining in terms of operations, rather than in terms of properties as had been the classical practice (The Nature of Physical Theory, New York: Dover Publications, 1936, p. 5-15). He promoted the convention that, in describing physical situations, we use only those concepts "to which we can give a meaning in terms of physical operations" (p. 10). Only then can we know that we have a meaning which can be confirmed by other observers, that is, communicated. Bridgman also said that operationalism applies not only to meaning for a concept but also to meaning for a question. He explained that he does not know what he means by a question until he can picture to himself what he would do to check the correctness of an answer which might be presented to him. He gave as an example of an unanswerable question the one used by W. K. Clifford:

   > Is it possible that as time goes on the dimensions of the universe may be continually changing, but in such a way that we can never detect it because all our measuring sticks are shrinking in the same way as everything else? (p. 12)

   Here, the only operation by which an answer can be objectively confirmed is ruled out by the question itself. Relativity emphasized the futility of asking questions about an object's absolute motion since there is no way of detecting such motion. For practitioners of a discipline, unanswerable questions and untestable hyphotheses are bypassed in favor of questions and hyphotheses which be formulated in terms of some sort of operation or observable behavior.

APPENDIX

Comparing Concepts

To estimate how you and another individual compare in the concepts you associate with terms such as "animal," "language," and "fruit," copy this test and let each of you, without consultation, mark one sheet according to these directions. Consider the concept you associate with the word heading a list. Draw a line through any word on that list which names something you would not include as representing your concept. There are no "right" or "wrong" responses and it's more appropriate to respond according to impulse. After both of you have marked your sheets, compare them. For each list, count the number of agreements (you *both* include the term, or you *both* marked it out). Divide the number of agreements by 10 to get a coefficient of comparison for this sampling of representatives for your concepts.

Animal

Fur
Leopard
Robin
Sponge
Unicorn
Trout
Woman
Egg
Zoo
Crocodile

Fruit

Pecan
Cucumber
Sugarcane
Peach
Pie
Tomato
Avocado
Orchard
Carrot
Seeds

Language

Chinese
Music
Latin
Morse Code
Ballet
Signing
Mathematics
Southern Drawl
Poetry
Grammar

Disease

Measles
High blood pressure
Alcoholism
Influenza
Fever
Claustrophobia
Bleeding
Appendicitis
Inflation
Drowning

PURSUIT OF QUALITY: A CONTINUING CHALLENGE FOR PROFESSIONAL COMMUNICATORS

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Consistent achievement of high quality, a fundamental obligation of all professional communicators, is far too often an elusive goal for even the most skilled practitioner. Professionals working in all media -- from spoken word to informal memorandum, from printed page to film or videotape -- must seek energetically, through heightened awareness, to enhance the quality of all communications entrusted to them.

Today's climate severely tests the true mettle of professional communicators. Long gone are the days of comfortable overstaffing, of leisurely training periods, of nearly automatic salary increases often unrelated to performance.

Careful Scrutiny

In these difficult economic times, managements everywhere are taking a close and critical look at all levels of staffing and at all functions being carried out within their organizations. Professional communicators are certainly not exempt from managements' careful scrutiny. Whether we are told or not, we know that managements in virtually all organizations are reviewing their communications functions in terms of maximum productivity with the minimum staffing necessary to do the desired job.

Certainly, the communications function in any organization is an essential one. Moreover, it can be argued convincingly that in troubled economic times, the function becomes critically important. Nevertheless, the fact remains that communicators, along with others who provide staff services today -- that is, those whose performance generally cannot be measured in terms of the dollars they contribute to the well-being of the enterprise -- must continually prove their worth and their value to their employers. This applies equally to all communications endeavors, whether in business, in manufacturing or service organizations, in research & development, or in academe.

A Position of Trust

Communicators must demonstrate their value through individual dedication to a difficult-to-define, elusive, yet attainable goal: the pursuit, achievement, and maintenance of quality. In his book, How to Write and Publish Engineering Papers and Reports, Herbert B. Michaelson states that "A realistic view of quality must include all of its elements: technical content, organization, literary style, validity, and significance." No one can quarrel with these elements; all of them are important and germane. But there are other elements, difficult to discern and to analyze, that are equally vital in the pursuit of quality.

Regardless of their specialty, and regardless of the particular 'end product' to be achieved, professional communicators must recognize that responsibility for communications -- from a single memo to the most sophisticated multimedia production -- evolves from a trust, on the part of management, in the ability of the communicator to create an added value to the raw data which communicators handle. That is to say, their work must result in a discernible and valuable 'plus.' Otherwise, why employ these professionals in the first place?

Thus, communicators ought to recognize their part in carrying out a fiduciary relationship -- a position of trust on the part of management in having their professionals produce communications of quality that will withstand the critical evaluation of many publics, including fellow employees, clients, prospects, professional colleagues, and, in many cases, the general public. Thus, to be worthy of their calling, communicators must be prepared to make a full professional commitment toward achieving consistently high levels of quality in the creation of any and all 'products' entrusted to them.

Goofs and Glitches

A feature story published in The New York Times on January 4 carried this intriguing title: "Publishers Battle the Goof and Glitch." And since almost all of us deal with words professionally, this article is of more than passing interest. "Typographical errors, misspellings and mistakes are the scourge of everyone who deals with the written word," the article states. It goes on to note that "many writers...believe that copy editing standards have never been lower." It's easy to see how this opinion has come to be held so widely. The belief certainly is based on the sorry state of many of the communications that surround us daily -- from newspapers to books, from single-sheet memoranda to comprehensive reports, from advertisements to computer print-outs.

But let us turn the situation around: what a challenge for professional communicators to prove their dedication to quality as they go about the daily work involved in transforming raw data into a highly polished product that can withstand the test of time. What an opportunity for communicators to demonstrate their commitment -- to their employers, to the product, to themselves as professionals worthy of the name.

Of course, our discussion in no way is restricted to the published word. Living in the age of the computer, we are cognizant of the all-pervasive influence of that machine on our daily lives. And as professional communicators, many of us are intimately involved, directly or indirectly, with computers. In that connection, the article points out that "many editors think that the computer age will reduce, if not eliminate, glitches and goofs." Others believe that, on the contrary, "more errors have crept in since the advent of computerized [typographic] composition." There you have it: on the one hand this, on the other one that. What's the answer? Or, what are the answers? Better still: are answers to these questions important and are they needed?

Under the Iceberg's Tip

In whatever form our communications are achieved, from the simplest to the most sophisticated, it seems clear that commitment and dedication on the part of professionals are needed now more than ever. But let us also recognize that 'the battle of the goof and the glitch' is only the tip of the iceberg. You may recall that only one-seventh of the mass of an iceberg is located above the water line. The other six-sevenths of the iceberg are hidden below the surface of the water. And that's where the real challenges for professional communicators are located: below the surface.

Some critical questions you must ask and be able to answer for yourself are these: As a professional communicator, are you certain of the purpose of the communication? Of the intended audience or audiences? How well do you know the structure of your own organization and its mindset? For instance, in business, how well do you know the industry in which you work? Your employer's competition, the competition's products, and its marketing approaches?

Closer to home: how responsive are you to requests for your professional services? Do you have a consistent sense of urgency in doing your job? How well are you able to marshal the talents of others -- inside as well as outside your organization -- to produce quality communications? The list of questions could go on at some length, but it serves to demonstrate what we mean by the hidden six-sevenths of the critical mass that impinges upon quality communications at the highest professional standards.

The Knowledge Explosion

The days of the professional communicator as exclusively a writer, an editor, a draftsman or designer, a film or tape producer -- those days are long past. Instead, a disappointing business climate, general belt-tightening, and fierce competition all have served to make stringent demands on professionals everywhere, communicators included. Today, we are expected -- and rightly so -- to be knowledgeable in a multitude of disciplines and specialties, ranging from related services in our own communications field to rather detailed knowledge of the industry or business in which we work. Increasingly, we are expected to be our own copy editor, rewrite person, proofreader, art director, and production specialist. Meeting these expectations in becoming 20th-Century 'renaissance men and women' constitutes a formidable challenge. At the same time, it may be the greatest compliment and vote of confidence professional communicators could receive.

Dimensions of Quality

Nowadays, we hear and read a great deal about the concern for quality of goods and services, quality control, quality circles, and the quality of company managements. Not enough, however, is being said about the way in which quality can be achieved. Too little emphasis is being placed on individual commitment to quality, perhaps because quality itself is so difficult to define, let alone to measure. Yet, we know instinctively that quality can come about only through individual commitment to its pursuit. Such as commitment involves attitudes, psychology, interpersonal relationships, and even subliminal factors.

Ideally, the pursuit of quality by professional communicators should be a 'given' in any setting. Unfortunately, our profession still includes too many individuals willing just to 'get by' and willing to let 'things get by,' -- too many who, consciously or otherwise, simply will not perform at the consistently high quality levels essential in today's environment. Carried to the extreme, the slovenly, misleading, incomplete, or incorrect communication can have disastrous consequences when affecting products and services that, in turn, can affect millions of lives. It takes little imagination to conjure up visions of nightmarish disasters that could result from the mislabeled medicine bottle, the mismarked gauge on an aircraft instrument panel, or the misleading instruction in a user manual for automobiles or biomedical equipment or a host of other end products.

Can Quality Be Taught?

Those concerned about the pursuit of quality by professional communicators must consider some simple but basic questions: can quality be taught? If so, where should it be taught, and by whom? Obviously, the answers are far from simple. Educators and training specialists would do well to seek to develop rational approaches toward a much greater emphasis on quality than ever before. Admittedly, it's a tall order. Perhaps a starting point might be the realization that quality in communications must be encouraged -- indeed, be insisted upon -- from kindergarten through graduate and professional school.

Increasingly, our schools and colleges are beginning to awaken to their responsibility for teaching students to think -- logically, conceptually, and creatively -- in the face of declining levels in reasoning and problem-solving skills. The ability to think is basic, of course, to any true learning experience. But at the same time, thinking that cannot be communicated clearly, unambiguously, is of little value in and of itself. Therefore, when we reach the point at which educators in all disciplines no longer will sit still for sloppy thinking, speaking, and writing, we will have taken a giant step in the pursuit of quality communication.

We will also have come a long way when writing assignments in schools across the country no longer are considered unpleasant chores or 'busy work.' And, if this weren't enough, consider the effect of assigning compositions to students as a form of punishment. No wonder most of the population can't put together a simple declarative sentence!

Now the only question is: who will educate the educators? And how long will it take until we see tangible, lasting results? Obviously, the jury on this case is still out.

A Final Word

To be fully effective, professional communicators everywhere must redouble their efforts. This entails a heightened and pervasive awareness of the considerable responsibilities with which they are entrusted. At the same time, it calls for a renewed emphasis on optimum individual productivity on the part of each practitioner.

Earlier, we said that the pursuit, achievement, and maintenance of quality represents a continuing goal for the profession. We noted that quality is difficult to define but that, even though elusive, it is attainable. As professionals, we cannot do less than dedicate ourselves -- wholeheartedly and enthusiastically -- toward its realization.

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THE TECHNICAL WRITERS USE OF
OF VISUAL FORMS

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ABSTRACT

In this paper we present the results of an experiment using visual patterns to teach organization to technically oriented writers. Members of the Chicago Chapter of the Society for Technical Communication helped the director of the Technical Communications program at the Illinois Institute of Technology evaluate this new method. The cooperative venture between the professional technical society and the academic institution led to a quick teaching technique useful in industry and in the classroom.

Technically-oriented writers may have writing anxiety because often they are conceptually or visually oriented, and not verbally or textually oriented. Perhaps the way to approach these writers is to present the instruction visually. An actual visual device may help the technically-oriented writer develop a consistent and coherent paper. We suggest replacing the loose form of the outline with actual shapes that serve as visual guides for the development of the thesis.

We experimented with three figures and found that two, the "hub and spokes" and the "S-curve," could successfully serve as visual forms for paper development. The results of the experiment indicate that the technique of visual forms may be effective for introducing the idea of order in a paper.

THEORY

Technically oriented people may have writing anxiety because often they are conceptually or visually oriented, and not verbally or textually oriented. Perhaps the way to approach these writers is to present the instruction visually. Coherence, one of the biggest problems in writing, may be taught through visual patterns.

When a writer has a subject and makes statements about that subject, the result of a thesis which must be developed with unified and coherent sentences and paragraphs. An inept writer may string sentences and facts together without regard to organization or coherence. Even if the writer devises a written outline of the paper, he or she may stray from the thesis. The standard outline tempts the novice writer to block ideas into separate groups of statements that are tenuously connected to the thesis or not connected at all. An actual visual device may help the technically oriented, inexperienced writer develop a consistent and coherent paper. We suggest replacing the loose form of the outline with actual shapes that serve as visual guides for the development of the thesis.

We experimented with three figures, the "hub and spokes," the "S-curve," and the pyramid, but we found that the writers preferred the first two figures, using them more often as visual forms for paper development. If writers can visualize the development of the thesis and actually plot the paper against a visual form, then they may write coherent papers, moving from a specific thesis to a logical conclusion, without losing sight of the controlling idea.

The figures help the novice writer order the paper, and once the order is determined, the writer can spend more time illustrating, supporting and editing the points in the paper.[1]. The figures are also mnemonic devices, helping the writer remember two methods of constructing a consistent and coherent argument.[2].

VISUAL PATTERNS

Hub and Spokes

A paper that uses examples to develop and support its thesis uses the "hub and spokes" figure. The writer constructs a sentence about the computer revolution, for example, which is the central idea of the paper, and supplies appropriate examples as evidence for the thesis. Then the writer visualizes the sentence as the hub and the examples as the spokes.

CS 208 083

S-Curve

The most common form of paper for the "S-curve" is the pro/con or the multiple evaluation paper. The writer may present the pros and cons of a single subject and arrive at a conclusion. Or, in multiple evaluation papers, the writer might evaluate two or more objects, all of which have the same general purpose, and make a recommendation. Visualizing the "S-curve" allows the writer to develop one side of the subject and then loop to the other side and develop it equally. Each loop of the "S" represents either the pro or the con. In a multiple evaluation paper, additional loops may be added to the "S" configuration if more than two objects are being evaluated against set standards. The recommendation or thesis may open or close the paper and so occurs as the origin or endpoint of the "S."

Pyramid

We also experimented with the pyramid, a traditional visual pattern to introduce the concept of inductive and deductive papers. But, when the writers were asked to select visual design and write a paper reflecting their choice of pattern, very few selected the pyramid design.

EXPERIMENTAL DESIGN

The design of the experiment involved five sections of students taking English 101 at the Illinois Institute of Technology. In all 97 students participated in the five hour (six session) unit on figures. Three sessions were devoted to instruction on the three forms; the fourth session asked students to draw the visual patterns for selected passages; and the first and sixth sessions were devoted to writing a paper before instruction and after instruction on visual forms. The essays were scored holistically by a group of readers from the Chicago Chpater of STC to determine if the brief unit had a significant effect upon writing.

RESULTS

The papers were scored holistically by six technical writers from the Chicago Chapter. In holistic scoring, papers are evaluated for total effectiveness rather than for diagnostic errors. Holistic scoring may be used to measure improvements in writing if pre-instruction and post-instruction writing of comparable purpose is used. For this experiment the technically oriented students were asked to write on the computer revolution before and after their instruction in visual forms.

Since the experiment did not include a control group being taught traditional outlining, we cannot establish statistical significance. But, with just three and a third hours of instruction in the visual forms, the improvement in scores reflects an upward trend. In a longer paper we include the data and the details of the experiment.[3]. The most successful essays (those receiving the holistic score of 7 or 8) reflected the "hub and spokes" and the "S-curve" figures. Thus, we feel visual forms may be an effective technique for introducing the idea of coherence and order, and we invite others to share effective visual approaches to organizing writing.

REFERENCES

1. John Freund, "Entropy and Composition," COLLEGE ENGLISH, January 1980, pp.493-516. In his article, Freund suggests that patterns for technical writing may decrease entropy (a measure of disorder).

2. A.M Tibbetts and Charlene Tibbetts, "Writing Successful Paragraphs," in READINGS FOR WRITERS, JoRay McCuen and Anthony C. Winkler (ed), 3/e, (New York: Harcourt Brace Jovanovich, Inc., 1980), p.138. The article includes examples of several different shapes. While we devised our own shapes for this experiment, we were able to select some models from this text to use in our experiment.

3. Susan Feinberg and Joan Abern, "Visual Patterns: An Experiment with Technically Oriented Writer," TECHNICAL COMMUNICATION, (to be published).

Toward the Four-Dimensional Page

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The more dimensions of length, width, depth, and time we conceive in an image, the greater the chances that we will recognize it quickly, remember it securely, and recall it accurately. We can apply this principle to improve one-dimensional, word-only training materials. Verbally, we can write in dialog, vary grammar and syntax, and use figures of speech and active verbs. Visually, we can replace words with symbols, present numeric data in tables and graphs, design pages for rapid scanning, depict solid objects in photographs and drawings, and signify motion in visuals.

"What is the use of a book," thought Lewis Carroll's Alice, "without pictures or conversations?" Of what use, indeed ask the readers of instructional manuals. From the classroom to the living room, readers are forsaking our bon mots for comic books and video games. And this preference for life-like visual images shouldn't surprise us. Ask yourself, don't you:

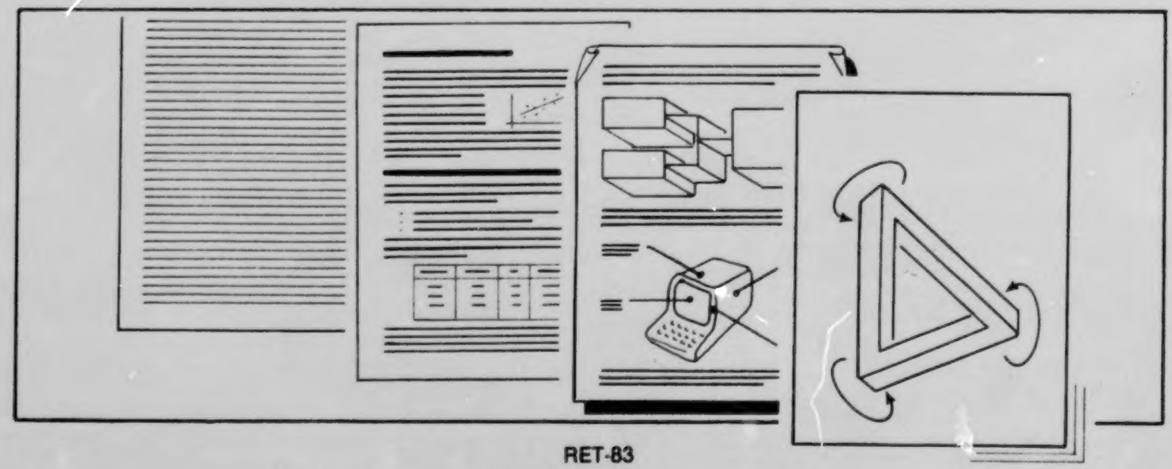
- Remember faces better than names?
- Understand photographs better than blueprints?
- Hope that the instructions for those Christmas toys marked "SOME ASSEMBLY REQUIRED" come with pictures?

Why does the mind prefer more complex life-like visual images to simpler verbal ones? (1) There is no shortage of explanations. One theory is that this is a holdover of the importance placed on stereoscopic vision during our limb-grabbing, spear-throwing evolutionary past. Mere words, lacking any of the visual clues of solid objects, thwart depth perception and are not attended to as closely as three-dimensional ones. Another theory is that each hemisphere of our brains specializes in a particular mode of processing information. (2) The left hemisphere, it says, controls the logical, verbal, and sequential processes, such as logical reasoning, mathematics, and speaking. Meanwhile, the right hemisphere supplies instinctive, visual, and spatial functions, such as creativity, insight, and pattern recognition. The right hemisphere is the artist; the left, the art critic. Three-dimensional images, because they are perceived immediately by the right hemisphere and also named by the left, create a more vivid impression in the memory. Gestalt psychologists have long noted that, through perceptual integration, the pattern-forming part of the mind handles three-dimensional images easier than it handles their separate components. (3) And recent theories claiming that the mind stores information much as a hologram records a three-dimensional image explain this predilection for three-dimensional images as nothing more than a case of psychological chauvinism. (4) Perhaps, as held by Hindu, Buddhist, and Taoist philosophers for centuries and recently suggested by some quantum physicists, the dimensions of space and time do not exist in their own right, but are synthesized by the mind as a way of organizing experience into meaningful patterns. (5)

Whatever the explanation, the effectiveness of solid visual images in aiding memory has been known and practiced since the days of the classical Greek orators, who taught their students to memorize speeches by imagining a house furnished with symbols of the ideas they wanted to remember. This, by the way, is where our expression "in the first place" comes from. The orators would recall their speeches by imagining they were walking through the house observing what was in each place.

Let me now restate the principle in slightly more general terms so we can use it to design better training materials.

> The more dimensions of length, width, depth, and time we conceive in an image, the greater the odds that it will be recognized quickly, remembered securely, and recalled accurately.



RET-83

ONE-DIMENSIONAL PAGE

Imagine a book. Between narrow margins run lines of text, uninterrupted by headings or illustrations. It looks something like most novels you read. This book is what I would call one dimensional. "But," you object, "a book takes up space and its pages have area. How can it be one-dimensional?" In this book, the ideas are presented one after another and could just as well have been printed on a long ribbon or transmitted along a digital communications channel on which one bit of information follows another. The word-gulping techniques of speed reading aside, we start reading at the upper-left corner of page one and proceed relentlessly and monotonously word by word through the last page. This one directional flow from past to future, through a necessary element of narratives and step-by-step instructions is, by itself, as dull as the legendary water torture (drip, drip, drip).

What miscreant, you ask, foisted on us the perfidy of the one-dimensional page? It's none other than the patron saint of printing, Johann Gutenberg. No, Gutenberg didn't set out to one-dimensionalize communications. But his technique of printing with movable type was so successful for printing words that the cost of printing words dropped a thousand fold, and the richness of visual images seen in manuscripts from the Egyptian papyri down through the illuminated parchments of the middle ages was left to the quill pen and the woodblock.

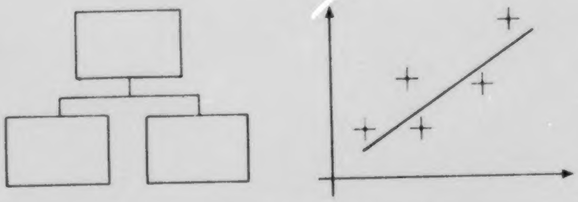
It is ironic that just as the word-biased tyranny of letterpress printing was supplanted by offset printing, which democratically prints just about anything we can draw or paste on a page, the ascendancy was restored to words by the development of low-cost electronic word-processors. But illustrators too have discovered the computer, and soon affordable image processors, capable of manipulating both words and visuals, will remove the last excuse for the one-dimensional page.

TWO-DIMENSIONAL PAGE

The two-dimensional page offers information for immediate perception without forcing the eye to consume it bit by bit. On the two-dimensional page the eye does not have to move down the page in repeated swipes. It has a choice: It can move up or down, left or right.

Display data in visuals

How do we create the two-dimensional page? For technical documents the most common way is to replace words with standard two-dimensional organizational charts, bar graphs, trend diagrams, pie charts and so forth. A related way is to place numeric data and sometimes words in tables.



Simple two-dimensional graphics

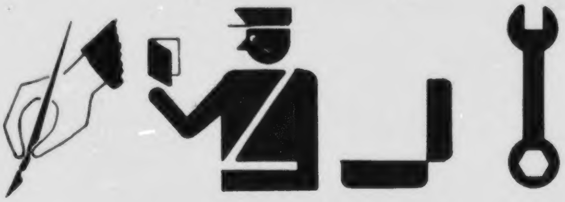
Design page for scanning

Another host of techniques involves the graphic design and layout of the page itself. The designer uses type size and weight, line length and spacing, indentation, underlining, white space, bullets, rules and boxes, and so forth to highlight headings, cautions, notes, and key terms. Careful graphic design enables the reader to find a specific nugget of information by quickly scanning the document, without having to read it word by word.

Replace words with visual symbols

Often visual symbols can replace words. A good visual symbol refines an object to one essential characteristic. The wordless signs you see in airports and on the dashboard of your car are examples. So are religious and political symbols. Trademarks too. We can use visual symbols on covers, in the table of contents, on tabs, and in headings.

Visual symbols



Because symbols are simple, they can be easy to draw, sometimes consisting of nothing more than "no-talent" typewriter graphics.

```
    0          //////////
----!----     ///////////
    !        +---------+//
    !        !         !//
   /!        !   BOX   !//
  / !        !         !/
 /  !        +---------+
```

Vary grammar and syntax

In practice the one-dimensional page does not exist. As any student who has diagrammed a sentence knows, only the simplest of sentences has a purely one-word-after-another structure. Punctuation, parenthetical phrases, and periodic structures also break the monotonous flow and give the writing a texture that we identify as part of the writer's style. Through variation in grammar and syntax can add interest to an otherwise flat piece of writing, they are tricky tools for adding dimension because they can also make it harder to understand.

Write dialog

Dialog, however, is an excellent tool to add dimension. In monolog attention moves steadily forward in time with the speaker's words. But in dialog it also moves back and forth from speaker to speaker. The use of dialog to communicate technical information is far from new. Galileo used it in his *Dialogues Concerning the Two New Sciences* to explain his discoveries about gravity. Today, for multiperson procedures we use a form called "playscript", which resembles the script for a Broadway play with all the speeches replaced with actions. "Don't we also use dialog," you ask, "whenever we pose a question on behalf of the reader?"

Playscript

```
ENGINEER:  Write first draft of report.
  TYPIST:  Type draft.
  EDITOR:  Remove profanity.
           Put in commas.
  TYPIST:  Retype draft.
ENGINEER:  Read edited draft.
           Complain of censorship.
```

THREE-DIMENSIONAL PAGE

Images jump off the three-dimensional page with a degree of realism not possible on the one- or two-dimensional page.

Capture depth in photographs

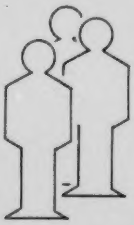
Photographs can capture the dimension of depth and bring it to the flat page. But not all photographs are truly three-dimensional. Skillful photographers use a variety of techniques to capture and control depth. (6)

- VIEWPOINT. Consider the straight-on shot of a building's facade or the mug-shot on your driver's license. Both lack the satisfying feeling of depth. To portray depth, the photograph must show both near and far objects.
- LIGHTING. Shadows reveal surface texture and relief and vividly suggest depth. This is why portrait photographers light the face from the side and why snapshots taken with an inexpensive flash camera often look flat and unrealistic. In fact, the notions of lighting, contrast, and depth are so closely linked, we can often produce a feeling of depth merely by increasing the contrast in a photograph.
- FOCUS. Hold your thumb up in front of your face and notice how, as you stare at it, the scene behind it blurs out of focus. In the photograph the in-focus zone is called "depth of field". Photographers use it to suggest depth by throwing nearer or farther objects out of focus, the same way the eye does. Of course, if the depth of field is too shallow, we get only a slice of the scene with no feeling of depth.
- COMPRESSION. Telephoto lenses seem to squeeze far and distant objects together, stripping the scene of depth. Wide-angle lenses, on the other hand, enhance the separation between near and far and dramatize the feeling of depth in a scene.

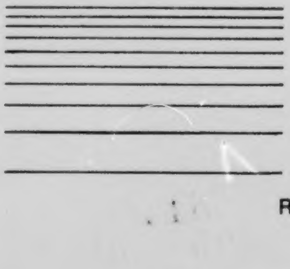
Portray depth in drawings

Like photographs, drawings can create the illusion of depth. Since men first drew bison on the walls of their caves at Altamira, artists have invented and honed techniques to capture the illusion of depth of flat surfaces. And in the last century psychologists have verified the potence of these "monocular cues" in conveying a feeling of depth. (7)

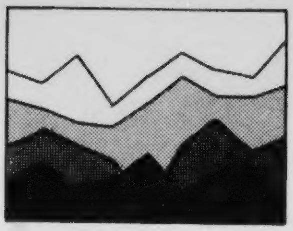
OVERLAP. Drawing one object in front of another states unequivocally that it is nearer. This is the strongest of monocular cues and arises whenever the lines of one object stop at the outline of another object. By artistic convention, lines of the more distant object do not actually touch the outline of the nearer one but hold back as if the nearer object were surrounded by a thin white aura.



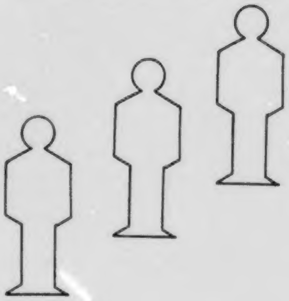
GRADIENT OF TEXTURE. Toward the horizon horizontal lines seem to get closer and closer together and textures grow finer. Blades of grass become a smooth green sheet; boulders become pebbles and then sand.



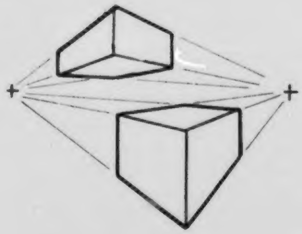
AERIAL PERSPECTIVE. On a hazy day, distant objects appear pale and bluish. Conversely, the mind perceives paler objects as more distant. This is one reason why driving in fog is so dangerous: objects obscured by fog appear to be farther away than they actually are.



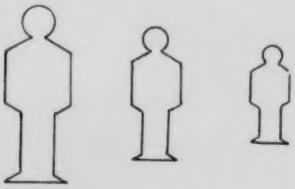
STAIRSTEP PERSPECTIVE. Objects on the floor or ground appear higher in our field of view when farther away. This is also called Chinese perspective after its use in classical Chinese painting.



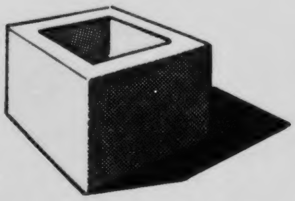
GEOMETRIC PERSPECTIVE. During the Italian Renaissance, artists such as Leonardo DaVinci and Albrecht Dürer recorded rules on when and how parallel lines seem to converge in the distance. Their several systems (isometric, dimetric, one-point, two-point, and three-point) can produce optically correct copies of retinal images.



SCALE. The size of a familiar image indicates its distance. Larger images seem closer; smaller ones farther away.



SHADING AND SHADOWS. Light reflected from a surface gives clues as to its orientation and position relative to the light source. Often the shadow alone is enough to make the mind see the solid object that cast it. So strong is the artistic convention of putting the light-source in the upper-left corner that reversing it makes hills appear as holes and vice versa. Highlights, glints, and reflections can also suggest depth.



Paint word pictures

Visual techniques are not the only ones available to add depth. Since the first hunting saga was told around a campfire, creative storytellers and writers have used figures of speech to conjure three-dimensional images in the minds of their audiences. Notice the three-dimensional images as a master technical writer describes marine life in the Gulf of California.

> Some of the exposed snails were so masked with forests of algae and hydroids that they were invisible to us. We found a worm-like fixed gastropod, many bivalves, including the long peanut-shaped boring clam; little brilliant-orange nudibranchs; hermit crabs; mantids; flatworms which seemed to flow over the rocks like living gelatin; sipunculids; and many limpets.
>
> — John Steinbeck
> The Log from the Sea of Cortez

Figures of speech create three-dimensional images by recalling images from memory and joining them together in imagination. But because such figures of speech rely entirely on the reader's memory and the reader's imagination, they never produce exactly the same image for any two readers. Do you think you could pick Raskolnikov out of a police lineup? It is exactly this creative ambiguity that suits them for fiction—and technical writing where accuracy is not paramount—and explains why we find a novel still fresh after a half dozen readings but grow bored with the second showing of a movie.

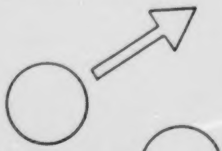
FOUR-DIMENSIONAL PAGE

The four-dimensional page pulses and squirms with images. It adds the dimension of time to those of space to portray change as it occurs. But injecting time into the inert page is legerdemain worthy of Harry Houdini. Our bag of tricks is smaller, but not empty.

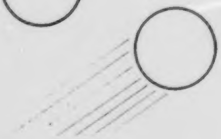
Signify motion in visuals

Technical illustration and cartooning offer a few standard conventions to indicate motion, such as:

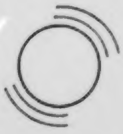
ARROWS point the direction of motion.



SPEED LINES trail behind the object. The number, length, and direction of the lines indicate its velocity.

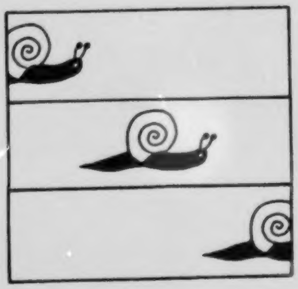


SHAKE LINES parallel the edge to show vibration.



In photographs the blur of a moving object or its background implies the speed with which it moves.

A series of illustrations can show the object at the various stages of change. When arranged one on top of the other, our habit of reading a page from top to bottom supplies the notion of time passing.



Use active verbs

Verbally, to convey time, do what every teacher of writing recommends: Use active verbs. Active, concrete verbs of movement vitalize technical writing by adding the fourth dimension to the static description. Note the feeling of action as Steinbeck, again from *The Log,* describes the procedure for removing a book from a special storage case:

> It took about ten minutes to remove the tarpaulin, untie the lashing line, open the cover, squeeze down between two crates of oranges, read the title of the wanted book upside down, remove it, close and lash and cover the box again.

AND BEYOND

So far, we've concentrated on improving black-on-white instruction manuals by using more of the dimensions of space and time in images. But the concept can go much further. We've all seen it used in reference manuals to make information more accessible and in ads to make it more eye catching. And by extending the concept of dimensions to include other sensory images, such as taste, smell, pitch and volume of sound, temperature, or color, we open the door to even greater degrees of interest and involvement by the reader. We can then mix and match these sensory dimensions with the literal ones, for instance, using color to replace depth, or length to represent temperature. With more dimensions at our disposal, the choice of a compatible medium becomes crucial. With electronic media to interactively mix audio, still and motion pictures, and text, the technical communicator of the future will indeed write on the four-dimensional page.

References

1. For a review of research on perception and recall of text and visuals, read Robert Waite's article "Making Information Easy to Use: a Summary of Research" in last year's proceedings. If you have a bit more time to spend, you may enjoy the book *Your Memory: a User's Guide* by Alan Baddeley, a British psychologist.
2. For a nontechnical explanation of the right-brain, left-brain theory see Betty Edward's *Drawing on the Right Side of the Brain.* For more detail, you can read the original technical papers by R. W. Sperry which are cited in *Drawing.*
3. See *Visual Perception* by Herschel Liebowitz (Macmillan, New York, 1965), page 82.
4. See the book *Shufflebrain* by Paul Pietsch.
5. Recently a spate of books have appeared pointing out similarities between Eastern occultism and quantum physics. Among the more readable and plausible ones are *The Dancing Wu Li Masters* by Gary Zukav, *The Tao of Physics* by Fritjof Capra, and *Mysticism and the New Physics* by Michael Talbot.
6. The best guide to these techniques is still Andreas Fenninger's *Total Picture Control.* For a slightly more technical treatment, you may want to try Ansel Adams's *Camera and Lens.*
7. For a psychological explanation, see *Perception* by Ronald Forgus. If you want to learn to apply these techniques, get a pencil and either *Draw: A Visual Approach to Thinking, Learning and Communicating* by Hanks and Belliston or *Thinking with a Pencil* by Henning Nelms.

AN EVALUATIVE AND PRESCRIPTIVE LOOK AT GRAPHICS RESEARCH

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Graphics research history shows that there are topics that have been studied heavily and others that have been almost entirely neglected. Furthermore, researchers have used many different methods of defining and measuring effects such as legibility and comprehension, and this, together with vagueness in reporting, makes it difficult to compare studies and draw reasonable conclusions. Current research is needed to validate past studies and to bring to light more of the underlying principles that guide reader reactions. This current research should: 1) be user and task specific; 2) study interaction effects and optimum concentrations; 3) employ prolonged periods of time and lengthy passages; 4) study the interaction of familiarity with the effectiveness of a device; 5) focus on the gaps in existing research (paper, ink, binding, color, illustrations); 6) report clearly how the research is conducted, what is measured, how it is measured, and what is found (statistical results); and 7) show which methods measure which attributes most effectively.

AN EVALUATIVE AND PRESCRIPTIVE LOOK AT GRAPHICS RESEARCH[1]

Certainly one of the most crucial skills required of a technical writer is the ability to choose and employ graphic devices wisely. By graphic devices I mean all non-textual, non-content, non-prose related variables that go into the presentation of a finished document. Therefore, I include typography, layout, illustration, color, paper and binding, all as species within the umbrella genus of graphics.

Literature and support documentation are key factors in the ease of use of a technical product and, in the long run, its successful marketing. Technical writers, to support products and provide customers with quality documentation, must be skilled in handling language, organizing content, and designing layout. The use of graphic devices are of prime importance in organizing content and, of course, in designing layout.

Heretofore, much of our handling of graphic devices and tools has been based upon an intuitive, innate feeling for the quality of a piece of work. While an intuitive sensitivity for the effective use of graphics is valuable in a technical writer, it is not sufficient for training future professionals.

Every profession has a history of development, during which time the general laws and underlying principles governing its subject are brought to light. Our profession has drawn its support from, among other areas, cognitive psychology (memory and information processing), engineering (information theory and human factors), composition research, rhetorical theory, and communication theory.

In order to strengthen our professional foundation, train future communicators, and produce the high quality documentation which will compete successfully in the marketplace, we need to continue to push back the borders of the unknown. At this point, taking stock of the existing graphics research will tell us what questions need to be answered by future research. This scrutiny, showing us some flaws in research methodologies, will allow us to avoid the same mistakes in the future.

Actually, a survey of graphics research unearths an inordinate amount of material. Close examination shows, however, that this research, still in a state of infancy, consists of heavily studied topics interspersed among vast neglected areas. Typography, for example, has been the most extensively studied area: an abundance of research has been done on type faces, type sizes, line lengths, interlinear space, column widths and lengths, widths of margins, justification of margins, headings, and cueing devices (caps, italics, boldness, extensions into the left margin, and underlining). On the other hand, very little work has been done on the relative effectiveness of illustrative materials such as charts, graphs, line drawings, half-tones, and photographs. Similarly, few studies have dealt with the effectiveness of color, either as a cueing device or in illustrations, ink, or paper, and virtually no research has looked at the effects of paper and binding on readability or affective reader preference. To conclude from this situation, future research should focus on the neglected areas to give us the information we need in order to design the most effective technical documents.

Measurement Methodologies in Graphics Research

Past research has studied the effects of graphic devices on readability, legibility, retention, comprehension, aesthetic preference, and, in a few instances, task performance (see Table 1).

Table 1

Effect of Graphic Techniques on Attributes: Taxonomy of Measurement Methodologies

ATTRIBUTE	MEASUREMENT METHODOLOGIES	
Readability	Eye Movement range of movement pupil size # involuntary blinks # fixations # regressions	Speed of Reading Reading Accuracy upside down rightside up Cloze Procedures
Legibility	# of words read during a brief exposure & correctly reported (tachistoscopic examination) Speed of Recognition (with accuracy) Recognition of letters in peripheral vision " " " at a distance " " " using focal variator (blurring image)	
Retention	Recall Recognition Rate of decrease in retention with increased length of material	
Comprehension	Multiple Choice Test Fill-in Questionnaire Rater's judgements of comprehensibility of passage	Cloze Procedures Open Recall (Storage & Retrieval) Ratio of core/enrichment content learned to total amount learned
Aesthetic Preference	Analysis of introspections Fill-in Questionnaire (Likert-type scales) Ranking adjective pairs describing enjoyment/helpfulness	

These are the methods that researchers have used in the past to measure the effects of graphic devices on readability, legibility, retention, comprehension, and reader preference.

To interpret the results of these studies for our own applications and uses, we have to know exactly what effect was measured and how it was measured. Unfortunately, many older studies are unclear in this area; future research reporting must detail this information clearly and thoroughly.

The bulk of graphics research is old, having been carried out between 1920 and 1965. Most of it was done by English researchers for the British Civil Service and by American researchers for the U.S. military. We must question whether the average English or military user has enough in common with our targeted populations to allow us to generalize the results from these studies to our applications.

Furthermore, because the research is old, many of the data collection methods are now considered to be outmoded and have been discredited. These methods may have distorted the results and, for this reason, the older studies need current validation before we can rely upon their findings and recommendations. For example, tachistoscopic examination of material in testing legibility has been generally disregarded as outmoded and unreliable (a tachistoscope flashes an image briefly upon a screen, and subjects are then asked to identify what they saw: the greater the number of correct identifications, the more legible the image is said to be). Ulric Neisser states that validity is violated in tachistoscopic examination of material, as we do not perceive or read material in isolation from its surrounding material:

> I believe that important aspects of the normal environment are being ignored in contemporary research paradigms. These aspects are the spatial, temporal, and intermodal continuities of real objects and events ... Tachistoscopic experiments simply do not tap normal perceptual skills, and the term perception cannot be consistently applied to anything that occurs in them.[2]

This means that many of the older studies must be suspect, including the works summarized by Vernon (1931).

Recently, researchers have concluded, for the same reason, that the older methods of measuring eye movements were ineffective in assessing legibility and readability: they violated ecological validity. The older methods of measuring eye movements were so intrusive that they removed the reading experience so far from the natural as to make any generalization doubtful. However, in 1975, Whalley and Fleming introduced a new camera system for recording eye movements. This system allows for a more naturalistic reading environment during testing, and may therefore be used to document the validity of the older findings. However, the theoretical assumptions behind using eye movements to measure legibility must be examined. Tinker (1963) says that blink rates do not reliably measure the level of reading difficulty (people blink their eyes for many different reasons).

We need, at this point, to examine and explore all of the measurement methodologies (again, see Table 1) and, in the future, use only those that are most sensitive and reliable. Hartley, Fraser, and Burnhill (1975) tested nine different measurement techniques and computed reliability coefficients for each. It is interesting to note that they found that the questionnaire is not a reliable method of assessing readability.

Contradictory findings in Graphics Research

As one might imagine, graphics research history is fraught with contradictory findings (see Table 2). Two prominent English graphics researchers, for instance, disagree on the effects of margin width: Burt (1959) says narrow margins produce visual fatigue while Spencer (1968) says they do not. To compare studies and judge results, we have to know the test audience characteristics, the subject matter, the degree of difficulty and length of the reading passages, and the measurement methodologies. For example, if one researcher measures visual fatigue by the number of eye fixations and the other by the amount of involuntary blinking or the speed of reading, our conclusions could be very different. If we are interested in the speed of reading, we would design our material according to the results of studies that measure the influence of graphic devices on speed of reading.

Interaction Effects and Relationships

The effectiveness of a particular device or technique is based on several things: the task characteristics, the user characteristics, and the subject matter, content, and length of the material (see Table 3).

Table 3

Items Affecting the Results of a Study
• User Characteristics • Task Characteristics • Subject, Content, and Length of Material • Presentation Format (Graphic Device) • Experimental Design • Measurement Methodologies

Additionally, there may be interaction effects between graphic devices, and there may be optimal levels (beyond which the effectivity decreases) for a particular technique. For example, underlining as a cueing device may be differentially effective in the following two situations:

- For secretaries trying to locate items within a text that is 10 pages long.
- For engineers trying to memorize key points within a text that is 5 pages long.

Additionally, the effectiveness of underlining may be influenced by type size and interlinear space. One last point to consider is that underlining may be incrementally more effective up to a certain concentration and decrementally effective (actually hamper performance) after that point. I'm sure we would all agree that underlining every other word in a passage for emphasis would produce information overload, hampering both locating and memorizing tasks.

Older graphics research deals exclusively with one causal variable (graphic device) and one effect (measured). Unfortunately, graphic devices most probably interact with each other, with user characteristics, and with task requirements. For complex interaction and naturalistic studies, which reveal a truer picture, the experimental design and analyses are quite complex and have only been developed within the past 10 to 15 years. Future graphics research, to be useful, must be user and task specific, must

Table 2

Examples of Contradictory Findings in Graphics Research

GRAPHIC DEVICE	EFFECT, FINDING, OR RECOMMENDATION	RESEARCHER
Narrow Margins	Produce more visual fatigue Don't produce more visual fatigue	Burt Spencer
Character Size	10 point recommended 12 point recommended Height:Width ratio of 10:7.5 and Stroke:Width ratio of 1:10	Burt Demilia Soar
Chunked Typography	Less Effective More Effective No Difference	Carver Frase & Schwartz Klare, North
Line Length	19 picas recommended Disputed (no reliable difference)	Demilia, Paterson Hartley, Burnhill
Underlining	Improves performance Does not improve learning	Schutz Katzman & Nyenhuis
Serif or Sans-serif	Sans-serif superior Serif superior	Taylor Burt, Spencer

study interaction effects, and must attempt to determine optimim concentrations (see Table 4).

Table 4

Task, User, and Passage Characteristics Affecting Studies and Affecting Graphic Device Impact

Tasks

- Identifying
- Locating
- Counting
- Memorizing
- Analyzing
- Drawing
- Recognition and Searching
- Comparing and Verifying (static or dynamic comparisons)
- Internal or External Pacing

Users

- Learning Characteristics
- Visualizers or Verbalizers
- High or Low Spatial Aptitude
- Grade Level
- Degree of Familiarity with Critical Parameters
- Background, Expertise

Passage

- Subject Matter & Content
  - Level of Vocabulary
  - Level of Conceptual Difficulty
  - Level of Readability
- Length or Amount of Text

Time Concerns

There are four additional concerns to take into account when interpreting results from past studies and when planning future ones:

- Length of the reading task.
- Amount of study time permitted the user.
- Familiarity of the user with the particular device.
- Timing of test deliverance (immediate or delayed post-test).

The effectiveness of a graphic device may depend on any or all of these considerations. To begin with, most graphics research has used very short intervals of time so we don't really know how users are affected by the devices under longer reading situations. Tinker (1955) did go back to see if his results would be verified with longer reading tasks (10 minutes versus 1.75 minutes) and they were, so we do have some reason to believe that past results can be generalized to longer task periods. As most technical documents and manuals are lengthy, future graphics research should use prolonged periods of time.

A graphic device can also be differentially effective depending upon whether the users are given only a certain amount of time in which to study the passage or perform the task, or whether they are allowed to proceed at their own pace. For instance, Dwyer found that for internally paced material, illustrations containing a high amount of realistic detail were most effective. Conversely, for externally paced material, a small amount of realistic detail proved to be most effective.

The effectiveness of a graphic device may also depend upon the user's familiarity with it. For example, if users are unfamiliar with a particular format or device, they may be negatively affected at first, but gain in performance or speed (or whatever effect is being measured) as it becomes more familiar. Therefore, it might be wise to pre-test subjects to innoculate or familiarize them with the format before testing. This is appropriate for graphics research because we may be more interested in the effectiveness of a device on a long-term user rather than on a novice.

Lastly, whether we are more interested in a device's immediate effects or its effect on, say, retention of material, will determine whether we should administer immediate or delayed post-tests.

Conclusions

Based upon a current assessment of past graphics research, future research is needed. This research should help us to both produce higher quality documentation and to more effectively train future technical communicators.

SUMMARY

Guidelines for Future Research

Future graphics research should:

- be user and task specific.
- study interaction effects and optimum concentrations.
- employ prolonged periods of time and lengthy passages.
- study the interaction of familiarity with the effectiveness of a device.
- focus on the gaps in existing research (paper, ink, binding, color, illustrations).
- report clearly how the study is conducted, what is measured, how it is measured, and what is found (statistical results).
- show which methods measure which attributes most effectively.

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[1] This article developed, in part, from my participation in a research project conducted at the Rensselaer Polytechnic Institute for IBM under contract #S945358QLSAE56. The research team consisted of Dr. Robert Krull (Research Director), Annette Bradford, A.B.D., Dr. Philip Rubens, Dr. Merrill Whitburn, and myself.

[2] Ulric Neisser, *Cognition and Reality: Principles and Implications of Cognitive Psychology* (San Francisco: W.H. Freeman and Company, 1976) pp. 34 & 46.

TEACHING WITH PICTURES

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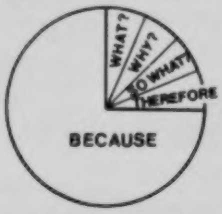
THE
OBJECTIVE
OF THIS WORKSHOP
IS TO DEMONSTRATE THE USE OF PICTURES
TO TRAIN STUDENTS IN SOME BASIC
PRINCIPLES OF COMMUNICATION

As our senses today are more in tune with a visual world, more so than ever before, it is desirable to use visual dynamics in communication.

The relative components of a technical report can be illustrated in a pie – chart:



This form of visual dynamics will be remembered, even though the words within the pie – chart may soon be forgotten.

No matter what your form of
communication is this
workshop and these
visual dynamics
should be
useful
to
U

HELPING STUDENTS SELL THEMSELVES THROUGH THEIR RESUMES

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This paper describes a method for helping applicants turn their resumes into sales brochures. It answers the question of what to include in a resume. It suggests an order of presentation that can contribute to an effective resume. And it considers the visual effect of how information is placed on the page and of different colors of paper and styles of print.

INTRODUCTION

As teachers of technical writing, we frequently find ourselves in a classroom of practical-minded students who seek our help in writing their resumes. The method we offer our students is designed to help them turn their resumes into sales brochures. It considers the types of information that should be included in the resume and the impact of different approaches to organizing the resume. Finally, it considers the visual impact of arrangement on the page and of the quality of print and paper.

CONTENT AND ORDER OF INFORMATION

Inexperienced resume writers often need to know what information to include in a resume. We advise our students that a resume typically includes nine categories of information:

- applicant's name, address, and phone number
- career or professional objective
- professional certification
- work experience
- education
- honors, awards, activities, and organizations
- hobbies or other interests
- personal data
- references

Because the order in which this information is presented can enhance an applicant's qualifications, we suggest the following general arrangement.

Name, Address, and Telephone Number

The applicant's name, address, and telephone number comprise the first entry a prospective employer expects to find. For emphasis, the name can be typed a size and a half larger than the print used elsewhere on the resume. All current addresses and telephone numbers (permanent, office, and home) should be included so that a prospective employer has a number of different ways to reach the applicant.

Career or Professional Objective

Applicants often neglect to state their career or professional objective. Yet research shows that prospective employers like to find this information on a resume (1). Listed immediately after an applicant's name, address, and telephone number, a career objective suggests an image of professionalism.

Professional Certification

To reinforce the image of professionalism, applicants who possess professional certification should include their license certification number immediately after their career objective.

Work Experience

A prospective employer is next concerned about an applicant's experience and educational qualifications. Resume writers should consider whether their experience or their education shows them to best advantage. If their experience is more impressive than their education, as is often the case with mature individuals, applicants should list experience first.

Resume writers whose work experience is more impressive than their education should give special attention to the order in which that experience is presented. Instead of resorting to simple chronological arrangement, they should evaluate their experience in terms of its relation to their professional objectives. Related work experience should be grouped together and placed before non-related work experience.

In listing jobs, applicants should be aware that prospective employers are primarily interested in job titles and duties. Of lesser significance are names and addresses of organizations and dates of employment. Consequently, job titles and duties should come first, and they should be displayed prominently.

Education

Education then follows. Since the degree and the major and minor fields are of most significance, these should be listed first or in a prominent place.

Honors, Awards, Activities, and Organizations

Now that the prospective employer's questions about education and experience have been answered, the resume writer can concentrate on building an image of professionalism by listing honors, awards, activities, and organizations. Here again, the order in which information is presented can contribute to a positive impression. Honors and awards should be listed first since they signify recognition from others. Next should come offices held in professional organizations, because these represent active participation and involvement, followed by memberships. Membership in professional organizations should be listed first, followed by community service organizations. Social organizations such as fraternities and sororities, since they generally contribute little to the image of professionalism, should come last.

Hobbies or Other Interests

The next category, Hobbies or Other Interests, can help to create a "persona" for a resume writer. However, this category has pitfalls as well as possibilities. If an applicant, for example, is applying for an accounting position and is interested in jogging, playing tennis, and designing new techniques for accounting, that individual should by all means list these interests. Travel might also be listed if it is not so extensive as to suggest an obsession that might interfere with work. Some hobbies, however, should be excluded. Sewing and crocheting could suggest passivity or timidity, qualities employers are not likely to be looking for. A prospective employer might consider interest in amateur boxing, hunting, or sky-diving suggestive of an overly aggressive personality incompatible with group decision-making. In general, the applicant is better off to steer a middle course in the Hobbies and Other Interests section by including only information that suggests a vigorous, yet moderate image.

Personal Data

Personal Data, like Hobbies or Other Interests, has possible shoals to be avoided. The resume writer should be selective about what is listed in this category.

The applicant's sex will affect what he or she includes in this section, despite disclaimers to the contrary. According to 61% of 165 chief personnel officers in some of the largest corporations in America, marital status should be included in the Personal Data section (2). However, the sex of the applicant can have a bearing on whether being married or single is interpreted favorably by a prospective employer. For a man, being married and having children is generally advantageous. Being single can suggest being unsettled; indicating that one is divorced conveys even more negative connotations. For a woman, being married can constitute a liability. Employers sometimes infer from this that a female employee is unwilling to relocate. As a general rule, applicants should consider omitting marital status unless they are reasonably certain it will work to their advantage.

Applicants should indicate willingness to relocate, if in fact they are willing, in this section of the resume.

Unless height and weight are actual job requisites, they are irrelevant and should be omitted. Also irrelevant in most instances is the applicant's sex.

Health is another item frequently included in the Personal Data section. On the surface, this information seems valueless since most applicants claim excellent health. However, despite questions concerning the validity of health statements, employers like to see health included under Personal Data (3).

An applicant's age and birthdate are often seen on resumes. But since this information can be weighed against an applicant, the resume writer should, as a rule, omit this information.

Finally, any additional personal skills such as bilingualism should be mentioned in this section.

References

The final category is References. The applicant should list at least three references, preferably work-related. A complete mailing address should be given for each reference. This address should be a business address, rather than a personal address, to ensure that the link between the reference and the place of employment is clear. In addition, references should be listed in the same order as the places of employment are listed under Work Experience.

VISUAL EFFECT

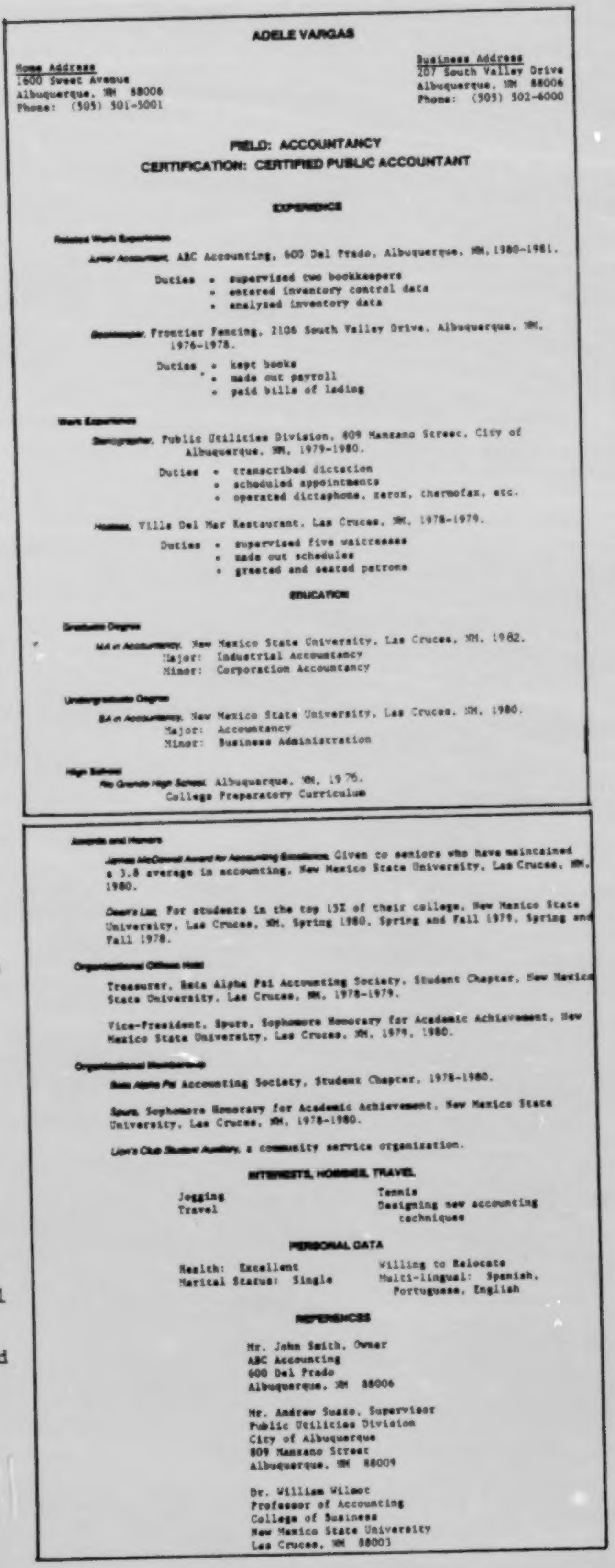
Placement of information on the page, type and color of paper, print style, and underlining of key words can all contribute to turning a resume into a sales brochure.

There are essentially two formats for placing information on the page: a left-to-right format with main headings to the left and a centered format with first-degree headings centered. The centered placement is superior to the left-to-right format because the former eliminates some side-to-side eye movement and thus contributes to ease of reading. Another advantage to the centered format is that it eliminates the "trapped white space" that gives resumes with too many indentations a busy look.

Type and color of paper are also important considerations. A good quality of bond paper should be used. Cream-colored paper, sufficiently subdued, can contribute substantially to a resume's attractiveness. It eliminates the glare of white bond, gives the resume a discreetly warm quality, and makes the resume distinctive in a stack with other resumes.

Different type faces should also be considered, although ornate or unusual type faces should be avoided. Type faces in italic, medium bold, and dark bold are available in certain fonts. Using these different shadings in a resume can emphasize different headings. Selective underlining also provides another means to highlight key words.

Finally, we offer a sample resume that shows the effect of our suggestions put into practice.



ADELE VARGAS

Home Address
1600 Sweet Avenue
Albuquerque, NM 88006
Phone: (505) 501-5001

Business Address
207 South Valley Drive
Albuquerque, NM 88006
Phone: (505) 502-6000

FIELD: ACCOUNTANCY
CERTIFICATION: CERTIFIED PUBLIC ACCOUNTANT

EXPERIENCE

Related Work Experience

Junior Accountant, ABC Accounting, 600 Del Prado, Albuquerque, NM, 1980-1981.

Duties
- supervised two bookkeepers
- entered inventory control data
- analyzed inventory data

Bookkeeper, Frontier Fencing, 2106 South Valley Drive, Albuquerque, NM, 1976-1978.

Duties
- kept books
- made out payroll
- paid bills of lading

Work Experience

Stenographer, Public Utilities Division, 809 Manzano Street, City of Albuquerque, NM, 1979-1980.

Duties
- transcribed dictation
- scheduled appointments
- operated dictaphone, xerox, thermofax, etc.

Hostess, Villa Del Mar Restaurant, Las Cruces, NM, 1978-1979.

Duties
- supervised five waitresses
- made out schedules
- greeted and seated patrons

EDUCATION

Graduate Degree

MA in Accountancy, New Mexico State University, Las Cruces, NM, 1982.
Major: Industrial Accountancy
Minor: Corporation Accountancy

Undergraduate Degree

BA in Accountancy, New Mexico State University, Las Cruces, NM, 1980.
Major: Accountancy
Minor: Business Administration

High School
Rio Grande High School, Albuquerque, NM, 1976.
College Preparatory Curriculum

Awards and Honors

James McDowell Award for Accounting Excellence. Given to seniors who have maintained a 3.8 average in accounting, New Mexico State University, Las Cruces, NM, 1980.

Dean's List. For students in the top 15% of their college, New Mexico State University, Las Cruces, NM, Spring 1980, Spring and Fall 1979, Spring and Fall 1978.

Organizational Offices Held

Treasurer, Beta Alpha Psi Accounting Society, Student Chapter, New Mexico State University, Las Cruces, NM, 1978-1979.

Vice-President, Spurs, Sophomore Honorary for Academic Achievement, New Mexico State University, Las Cruces, NM, 1979, 1980.

Organizational Memberships

Beta Alpha Psi Accounting Society, Student Chapter, 1978-1980.

Spurs, Sophomore Honorary for Academic Achievement, New Mexico State University, Las Cruces, NM, 1978-1980.

Lion's Club Student Auxiliary, a community service organization.

INTERESTS, HOBBIES, TRAVEL

Jogging	Tennis
Travel	Designing new accounting techniques

PERSONAL DATA

Health: Excellent	Willing to Relocate
Marital Status: Single	Multi-lingual: Spanish, Portuguese, English

REFERENCES

Mr. John Smith, Owner
ABC Accounting
600 Del Prado
Albuquerque, NM 88006

Mr. Andrew Suazo, Supervisor
Public Utilities Division
City of Albuquerque
809 Manzano Street
Albuquerque, NM 88009

Dr. William Wilmot
Professor of Accounting
College of Business
New Mexico State University
Las Cruces, NM 88003

REFERENCES

1. Barron Wells, Nelda Spinks, and Janice Hargrave, "A Survey of the Chief Personnel Officers in the 500 Largest Corporations in the United States to Determine Their Preferences in Job Application Letters and Personal Resumes," American Business Communication Association Bulletin 44(2):5.

2. Barron Wells, Nelda Spinks, and Janice Hargrave, p. 5.

3. Barron Wells, Nelda Spinks, and Janice Hargrave, p. 5.

ED239273

THE DEVELOPMENT OF AN INTERVIEWING COURSE

Helen Quinn
University of Wisconsin-Stout

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After studying interviewing theory and technique, one comes to think of the interviewing class as the "speech" class of the technical communication field. "Interview" no longer means only the job interview; to be sure, the term encompasses all of that important discourse that evolves as the technical communicator spends his or her day taking part in the performance appraisal interview, the information getting interview or perhaps the counseling interview, just to name a few. In the business and technical world, men and women do not, on a regular basis, stand up and lecture, as they are taught to do in the liberal arts speech classroom. However, they do interview, and a course developed around this valuable skill must become an integral part of the technical communicator's curriculum. Indeed, the practical application of interviewing theory is a necessity for the "tech. com." student.

The development of an interviewing course must begin with an analysis of the school, the students, and the type of jobs that the students will most commonly secure upon graduation. This valuable information will allow the interviewing class instructor to strike the proper balance as he attempts to decide on just how much theory and practical application should be offered in his particular classroom. Technically oriented students will, perhaps, be in need of a more practical "hands on" format.

Furthermore, the actual planning of the day to day course work should also reflect student need. The technically oriented school should stress small group communication theory leading into the study of the various interviews used most commonly in the workplace. Guest speakers from related disciplines should supplement this study as a means of intensifying the "hands on", "real world" nature of the approach. Finally, the study of the resume must be stressed because the all important resume is certainly a vital part of what is, perhaps, the most relevant of the interviews: the job interview.

In conclusion, although interviewing may have in the past seemed to be a mere exercise in spontaneous discourse, today it is a vital and structured component of the techical communicator's repertoire of skills.

INTRODUCTION

The University of Wisconsin-Stout, Menomonie, is a rather unique school often described as a "hands on" vocational, technical university. Stout offers a number of industrially and technically oriented four-year degree programs such as Industrial Technology, Industrial Education, Hotel and Restaurant Management as well as Vocational Rehabilitation, to name only a few. Indeed, UW-Stout is well known for its versatility as a learning environment that allows students to experience the humanities as they partake in their general liberal studies, and yet reap the benefits (jobs, money) of industry as they assume employment upon graduation.

Because Stout is, in many respects, a technical university, the students who will ultimately secure jobs that they have been academically prepared for in industrial or technological areas should be well-versed in terms of their ability to communicate in the workplace. Therefore, nearly all of these students are strongly urged to include technical writing as part of their course of study. Although this recommendation is certainly a step in the right direction, it seems that future technical communicators should also be familiar with the art of interviewing. Expertise in the area of written communication is undoubtedly important for those entering the administrative or managerial sector in the industrial and technological world of work; however, correct and effective oral communication in this setting is just as important. Indeed, because of its job-specific importance, interviewing will be a major component of the oral communication that the industrially or technologically inclined Stout grad will take part in as he becomes an employee (probably a manager) in his chosen field.

In this world of work that the aforementioned Stout student will enter upon graduation, "interview" no longer means only the job interview; to be sure, the term encompasses all of that important discourse that evolves as the technical communicator spends his day taking part in the performance appraisal interview, the information getting interview or perhaps the counseling interview, just to name a few. In the business and technical world, men and women do not, on a regular basis, stand up and lecture, as they are taught to do in the liberal arts classroom. However, they do interview, and a course developed around this valuable skill must become an integral part of the technical communicator's curriculum. Indeed, the practical application of interviewing theory is a necessity for the "tech. com." student.

With this background information in mind, although the obvious culmination of an interviewing course might initially seem to be a literature review, an actual interview or perhaps an investigative paper, there are, to be sure, other options. Due to the previously described "hands on" technical nature of the University of Wisconsin-Stout, and because the English Department at Stout is pursuing the idea of establishing a much needed technical writing minor, I decided on the design of an interviewing course, intended to meet the somewhat unique needs of the Stout student, as my major project for the interviewing course offered by the Department of Rhetoric at the University of Minnesota. As a composition teacher, English Department tutor, and writing consultant at Stout, I felt that the design of such a course would enhance my understanding of the steps necessary to the creation and implementation of a new course of study. Furthermore, such a project would allow me to more completely and realistically utilize the interviewing theory imparted via the Rhetoric department interviewing class.

The obvious question at this point would be: why include an interviewing class, usually thought of as a concern of the Speech department, as part of a technical writing minor offered by an English department. The answer is really quite simple. Because of the technical and industrial emphasis at Stout, the job market considered by many of the grads will also be technical or industrial; and, these students cannot be ignorant of the relationship between written and oral communication in their chosen world of work. Furthermore, although technical *communication* would be a better emphasis for the tentative English department minor, technical writing is, of course, what it will be. Therefore, it is important that these technical writers also be given a dose of oral communication theory in order to emphasize the important relationship between writing and speaking for the technically inclined communicator. Consider the resume. Although a written document, it is inextricably related to an important exercise in oral communication, the interview.

As part of their major course of study, a large and growing number of UW-Stout students are required to take the class offered through the English department which is rather ambiguously entitled "Technical Writing." As the general nature of the course title suggests, the class format has been broad based and somewhat unspecified in terms of subject matter covered. Furthermore, because the dubious scope of the course has recently been criticized by some of the Stout program directors who are including technical writing as a requirement in their various disciplines, the English department (in particular,

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the specially designated Technical Writing Committee) has decided to review and revise its intent regarding the teaching of technical writing. To be sure, the department must begin to more completely and specifically offer the various aspects of technical communication in the more rational and effective form of a number of classes instead of the traditional and probably ineffective form of one all encompassing technical communication experience.

With this revisionary trend in mind, it would seem that an interviewing course (offered through the English department, of course) could be a logical and worthwhile result of such an academic purgation of the present technical communication program. Moreover, it is important to note that one specific criticism of the technical writing course now offered is that the English department instructors deal far too narrowly with technical communication, and consequently spend too much time on the employment interview and the resume. Although the program directors certainly offer this criticism in good faith, they seem oblivious to the fact that the students *want* job interviewing skills and specifically ask that these strategies be offered as part of the technical writing training at Stout. Thus, after considering the criticism propounded by the program directors and the concerns vociferated by the students, a course designed to deal exclusively with interviewing theory (including the employment interview) would seem to be the perfect solution to the problem as well as the beginning of a more critical and careful approach to the offering of technical communication information.

My own study of interviewing theory has shown me that the study of the employment interview, the resume, the other types of interviews most commonly conducted, as well as a great deal of general interviewing theory, would fit perfectly into a separate technical communication course which I have come to think of as the "speech class" of the technical writing minor that is being discussed at Stout. Indeed, because of the proposed minor, and because of the necessity of such a course if the minor is adopted, and just as importantly simply because an interviewing course would help the Stout English department instructors to respond to the criticism originated by the program directors, the interviewing class that I am designing does seem to be a timely idea.

I must stress that I now realize (after working on the class for some time) that the design of a new course is a complex and, to be sure, continuing endeavor. I realize that I have merely "scratched the surface" in terms of actually adapting theory to the pursuits stressed at our rather specialized university. Nevertheless, although the project is an on going endeavor, I feel satisfied to know that the knowledge that I have gained thus far will help me professionally (as a teacher) and academically (as a technical communication student).

One rather odd bit of information that has been suggested by my research is the fact that I may have to write my own "stuff" if I do want to properly address the specific programs at Stout and their special relationship to the interviewing process. Initially, my discovery of the dearth of published material (which I will discuss later in the paper) concerning interviewing and its relationship to Vocational Rehabilitation Education, Home Economics Education, Industrial Education, and the like, seemed demoralizing; however, I have come to see this possibility of future research and compilation of information as a challenge to me as a teacher at Stout.

In summary, my project has excited me. I have never before attempted such an undertaking, and, although I have, admittedly, found parts of my endeavor to be somewhat "Mickey Mouse," I do ultimately feel satisfied in the sense that I have learned of the importance of the interviewing process and have put this information "to work" in a practical and worthwhile manner. It is not often that theory can be immediately implemented in the educational or professional realm; however, in this case, the transfer was easily and pleasantly completed. In short, I'm "sold" on interviewing as a very practical and important component of the technical communication field.

Discussion of the Proposed Course with UW-Stout English Department Technical Writing Committee Members

Because the English Department Technical Writing Committee has been meeting for some time to discuss the previously mentioned possibility of a technical writing minor, it seemed only fitting that my leap into notoriety as a creator of new and exciting academic possibilities should begin by discussing my idea for an interviewing course with members of the committee. Accordingly, I presented my proposal to several committee members and am pleased to report that I received their approval. They were interested to know that a new technical communication course would be available if the opportunity for implementation of such a class presented itself in the future. Also, the committee) members told me of the criticism stemming from the dissatisfaction of the program directors in terms of material being offered in the technical writing class. We discussed how an interviewing class could easily and effectively serve as a vehicle for the teaching of the popular employment interview and resume as well as other interviewing theory and also provide practical information that could benefit the Stout students as they take their places in the world of business, technology or education.

Initially, the committee members felt that a quarter course would sufficiently cover the necessary material; however, after further consideration of the interpersonal communication theory that I see as an important part of the course, I still felt that a semester plan would be far more realistic and effective. The course would yield three semester credits and would probably be a requirement if the technical writing minor did, indeed, become a reality.

Finding Textbooks

After discussing the interviewing course with the members of the Technical Writing Committee, I decided that my next step would be to find good textbooks. Although the Stewart and Cash book, *Interviewing Principles and Practices*, used for the interviewing class at the University of Minnesota is certainly an excellent text, it is far too theoretical and complex for the UW-Stout undergraduate. I knew that I needed sources full of practical application and general theory.

Because of my recent experience as chairperson of our Freshman English Committee, I have come in contact with numerous book salespeople. Thus, I began my textbook search by calling the ones that I have dealt with most seriously.

I immediately discovered that these salespeople are terribly anxious to sell books. In addition, I discovered, much to my dismay, that there are very few simple interviewing texts to be sold.

Three of the people I contacted informed me that they could provide good counseling books and some widely used general theory texts, but were unable to provide me with the type of book that was absolutely necessary to meet my needs. Notwithstanding, Scott, Foresman and Company came to my rescue with three new (1982) and worthwhile interviewing and interpersonal communication texts;

Steven A. Beebe and John T. Masterson: *Communicating in Small Groups: Principles and Practices*

Allan D. Fank: *Communicating on the Job*

Lois J. Einhorn, Patricia Hayes Bradley, John E. Baird, Jr.: *Effective Employment Interviewing*

Furthermore, I have chosen sections from some general technical writing textbooks, which I found in our English Department reference room, to supplement the aforementioned books:

Eisenberg, Anne. *Effective Technical Communication*. New York: McGraw-Hill, Inc., 1982.

Huseman, Richard C., James M. Lahiff, and John D. Hatfield. *Business Communication*. Hinsdale, Illinois: Holt, Rinehart and Winston, 1981.

Sigband, Norman B. and David N. Bateman. *Communicating in Business*. Glenview, Illinois: Scott, Foresman and Company, 1981.

As indicated by the titles, two of the texts that I have chosen (the Beebe and Masterson book as well as the Frank text) deal with small group and interpersonal communication. This type of introductory information, leading up to the actual introduction of the interview as an important tool in the technical and educational world, will certainly enhance the effectiveness of the course. Liberal studies are not stressed at Stout; accordingly, this liberal arts "communication theory" approach to the interview will allow the students to experience interviewing as more than a mere exercise in spontaneous discourse.

The above mentioned communication theory texts deal extensively with the importance of the give and take of information in contemporary society. Beebe and Masterson stress the importance of simply being able to "relate" verbally and socially, and Frank carries this general premise to the workplace, which is, to be sure, the place that is utmost in the minds of most Stout students. In short, the more simplistic approach of Beebe and Masterson will allow the student to finally see the importance of Frank's assertion that being able to communicate in the workplace is a vital and necessary skill. Similarly, in order to be effective interviewers and interviewees, students must be cognizant of principles; Beebe, Masterson and Frank provide vehicles that will enable me to transmit these principles to the Stout students.

After the students have studied interpersonal communication and general interviewing theory, I will move on to the supplementary texts and the units from these books which are relevant to the actual interviewing process: "Interviewing as a Management Tool" (Huseman, Lahiff, and Hatfield, chapter 15), and "Conducting Effective Interviews and Meetings" (Sigband and Bateman, chapter 19). Frank does cover the interviewing process to some extent; however, the sections from the supplementary texts more completely and specifically define and discuss the various types of interviews.

Finally, I will move on to the employment interview and the resume. To reiterate, the resume and the employment interview are extremely important to the Stout student. The university boasts of an exceptionally high job placement rate; therefore, students anxiously await the opportunity to "sell themselves" via the initial resume and the final interview. The Einhorn, Bradley, and Baird book deals effectively and simply with the employment interview. The resume is discussed; however, the section on the resume in the Sigband and Bateman book deals in more detail with the actual writing of the vita sheet. Therefore, these two books should together help me to thoroughly present the all important resume.

In brief, I have chosen a number of texts and, perhaps, an unrealistic amount of reading. However, as I stated in my introduction, I am involved in the continuing process of the construction of this course. I am quite certain that I will feel the need to alter texts and assignments if I move into the actual teaching of the class.

Nevertheless, a definite pattern is unfolding as suggested by the sequence of textbooks as well as the material covered in each. From the study of very general communication theory, the students will move on to the more specific study of the manner in which these principles actually apply to the give and take of information in the workplace. As a result of this initial study and preparation, the students will be able to become familiar with the specific kinds of interviewing which will ultimately lead to the final component of the class plan which is, of course, an in-depth look at the employment interview.

The Bibliography: My Introduction to the Computer Search

After reading through a number of thorough and yet general interviewing bibliographies, I was hoping that I would be able to discover materials more appropriately suited to my specific concerns: areas such as Vocational Rehabilitation, Home Economics Education, Industrial Education, and Industrial Technology. I began my search for relevant materials by meeting with a UW-Stout research librarian. We discussed the nature of my project and the types of interviewing situations that I was hoping to highlight. Unfortunately, the librarian was pessimistic and felt that I would be the perfect candidate for a computer search.

I began the search process by scanning the numerous bibliographies included in the technical writing texts available in our English department. Also, I completed a general search of ERIC, Psychological Abstracts, the Education Index and Business Periodicals in hopes of discovering terms that would allow us to pick the computer's brain. The librarian suggested that I use the indexes listed above; I feel now that I could, perhaps, have gone further as I completed this initial stage of the search, but I will discuss that problem later in the paper.

After this initial search for terms, I met again with the librarian and we began to design our search strategies. I should note here that I say "we" because I did everything with the librarian. We cross referenced general interviewing theory with the disciplines I hoped to specifically address in terms of their relationship to the interviewing process.

After designing strategies for three bases (ERIC, INFORM and Psychological Abstracts), we began the actual search. As the search progressed, I realized, much to my dismay, that the librarian's initial fears were, indeed, well founded; there was very little material to be found that dealt primarily with interviewing theory and the "hands on" Stout disciplines. Nevertheless, we did find some information, and, more importantly, I discovered what *wasn't* to be found. To be sure, acknowledging the lack of material has led me to the realization that I may have to, at some point, create my own handouts.

To conclude, after my own search had been completed, I discussed my results with several people who had used the computer strategy at other schools. My feeling then was that my search was, perhaps, lacking, and that there would be value in employing another search before I began teaching the course. However, after completing the course plan, I realize that general information on the interviewing process will probably be sufficient for the purposes of the class, provided that it is supplemented with specific information that will undoubtedly surface as I begin to teach Stout students and address their specific situations.

Class Plan

A. Basic Course Information

Department: English

Course Title: *Interviewing: Communication for Survival in the Technical World*

Course Number: 326- 3--

Lecture/Lab Hours: 3 Lecture

Semester Credits: 3

Prerequisites: Successful completion of English 101 and 102 (Freshman Composition) or 111 and 112 (Honors Freshman Composition)

Semester or Quarter: Semester

Recommended Class Size: 30

Mode of Instruction: Lecture/Discussion

B. Objectives

As a result of this course, the student will be able to:

1. understand basic interpersonal communication theory
2. understand the common types of interviewing used in the workplace.
3. utilize these interviewing types upon graduation and/or entrance into the workplace
4. understand interviewing strategy as a basic communication skill necessary for survival in the technical world (industry, home economics, vocational rehabilitation, etc.)
5. be ready to actually participate in an employment interview
6. write a professionally correct resume

C. Rationale

Just as the English 101 (Freshman Composition) class at the University of Wisconsin-Stout should be used as a vehicle for the teaching of written expression as a basic and necessary skill if one is to successfully function as a student in the academic setting, so should the interviewing class offered through the English Department act as a vehicle for the teaching of interviewing strategy and theory as a basic and necessary survival skill if one is to successfully function as a participant in the technical workplace. Indeed, if the technical communication experience at Stout is to be complete, the student must have access to an interviewing course which will function as the "speech class" of the technical communication program.

D. Evaluation

1. Study questions (group or individual)
2. Class participation

3. Completion of several role playing situations (2-3 to be written up and analyzed)

4. Analysis of the role playing situations completed by other students (2 to be written up)

5. Completion of an interview of a professional person in the student's field (written up)

6. Completion of a professional resume

7. Completion of a major project: a paper or other activity to be chosen by the student

8. Final essay exam

E. Learning Resources Needed

Probable Texts: *Communicating on the Job* - Allan D. Fank (F)

Effective Employment Interviewing - Lois J. Einhorn, Patrician Hayes Bradley and John E. Baird Jr. (EBB)

Communicating in Small Groups: Principles and Practices - Steven A. Beebe and John T. Masterson (BM)

Business Communication - Richard C. Huseman James M. Lahiff and John D. Hatfield (HLH)

Communicating in Business - Norman B. Sigband and David N. Bateman (SB)

F. Format

Week #1 (2 lecture/discussion days - 1 group study day)
-Introduction to class (lecture)
-Explanation of material to be covered, grading system etc. and formation of study groups.
-Introduction to small group communication theory: BM: Chapters 1, 2, and 4
-Group study questions to be discussed in group and handed in by individual members at a later date (questions taken from BM chapters)

Week #2 (2 lecture/discussion days - 1 group study day)
-More discussion of small group communication: BM: Chapters 6, 9, and 10
-Group study questions to be discussed in group and handed in by individual members at a later date (questions taken from BM chapters)

Week #3 (2 lecture/discussion days - 1 group study day)
-Introduction to communication on the job: F: Chapters 1 and 3
-Group study questions (same procedure as used previously) (questions taken from F)

Week #4 (2 lecture/discussion days - 1 group study day)
-More discussion of communication on the job: F: Chapters 4 and 5
-Group study questions (same procedure) - (questions taken from F)

Week #5 (2 lecture/discussion days - 1 group study day)
-Introduction to the interview: the interview defined: F: Chapter 7 (excluding the section on specific types of interviews) plus extra handouts on the interviewing process (introductory information) - SB: Chapter 19
-Group study questions (same procedure) - (questions taken from F)

Week #6 (2 lecture/discussion days - 1 day reserved for guest speaker)
-Discussion of the Performance - Appraisal Interview: HLH: pages 308-310; F: pages 222-226 - plus extensive handouts on this type of interview
-Guest speaker (hopefully some person from a local industry or an educator who would be knowledgeable in this area)

Week #7 (2 lecture/discussion days - 1 day reserved for guest speaker)
-Discussion of the Information - Getting Interview: HLH: page 313; F: pages 226-228 - plus handouts on this type of interview
-Guest speaker (hopefully a person in management from a local industry)
-Assignment of final project/paper (discussion/handouts)

Week #8 and Week #9
-Discussion of information presented by guest speakers
-Role playing: students will role play from information given out by the instructor - one student will take the part of interviewer and another the part of interviewee - all students will be able to participate in this time period of probably 4½ class periods - each student will analyze his/her own role playing experience and will be assigned the analysis of the role playing completed by one other class member
-Assignment of the interview of a professional person in each student's field (handouts/discussion)

Week #10 (2 lecture/discussion days - 1 day reserved for guest speaker)
-Discussion of the Exit Interview: HLH: page 312 - plus extensive handouts on this type of interview
-Guest speaker (a person in management)

Week #11 (1 lecture/discussion day - 2 days reserved for guest speakers)
-Discussion of the Correction Interview and the Orientation Interview: HLH: pages 310-312 - plus handouts
-Guest speaker to discuss the Correction Interview (an educator)
-Guest speaker to discuss the Orientation Interview (from industry)

Week # (1 lecture/discussion day - 2 days reserved for guest speakers)
-Discussion of the Counseling Interview: F: pages 218-221 - plus extensive handouts
-Guest speakers to discuss the Counseling Interview (from Vocational Rehabilitation at Stout and from the Counseling Center at Stout)
-Interview of professional due

Week #13 and Week #14
-Discussion on information presented by guest speakers
-Role playing (same procedure as used for weeks 8 and 9)

Week #15 (3 lecture/discussion days)
-Introduction to the Employment Interview: EBB: Chapters 1, 2, and 3; SB: pages 399-410; HLH: Chapter 18

Week #16 (3 lecture/discussion days)
-More discussion of the Employment Interview: EBB: Chapters 4, 5, 6, and 7
-Introduction to the resume: SB: Chapter 21; HLH: Chapter 17
-Assignment of the resume

Week #17 (2 days reserved for in class work - 1 day reserved for a guest speaker)
-In class work on student resumes
-Guest speaker (an employment counselor)

Week #18 (Final week of class)
-Monday: Resume due - final projects due - Guest speaker (a recruiter from one of the firms or industries that regularly search Stout for future employees)
-Wednesday: Review for final exam
-Friday: Final exam

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TEACHING EFFECTIVE INTERVIEWING TECHNIQUES

Frankie Clemons
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American Bus. Comm. Assn.
Academy of Management
Outstanding Paper,
27th ITCC

To insure an effective interview, one needs to prepare thoroughly. One needs to know how to prepare for, how to conduct oneself during and how to follow up after an interview.

Researching self and the organization are necessary for intelligent responses and questions as to goals, skills and expectations. Preparing for irrelevant or illegal questions and assessing the interviewer's attitudes and personality establish credibility for the interviewee.

Other recommendations for a good interview are to have supplementary materials on hand, to be aware of one's professional posture, to learn nonverbal communication skills, and to be able to guide the interview to a positive conclusion. Thinking and planning are a must for an effective interview.

If you want your students to have a successful interview, the students must prepare themselves thoroughly. This means the student must know what goes into the preparation for an interview, how to conduct themselves during the interview, and how to follow up after the interview.

PREPARING FOR AN INTERVIEW

To prepare for an interview, the student needs to "research" himself/herself and research the employing organization. The interviewee must be ready to react to the interviewer's personality and attitudes regarding the interview. And, the interviewee must anticipate any irrelevant or illegal questions that might arise in the interview in order to prepare responses to these questions.

For the student, researching oneself involves knowing one's present and future career goals; one's strengths and weaknesses; one's job expectations such as analyzing your ability to work with others, job preferences, and ability to learn from mistakes; and one's willingness to both accept supervision and to assume responsibility.

Researching the employing company is important; this cannot be expressed too strongly to the student. One gains credibility and stature in the interviewer's eyes by showing he/she has investigated and understands the organization. This preparation allows intelligent, knowledgeable questions to be asked and guides the interview toward the goal of obtaining the position.

Having a Company Data Sheet on the interviewing company to use as a guideline is useful in preparing for an interview. This guide usually includes the company's major products and services, the key executives, the location of offices and plants, and the size of the organization in terms of sales, number of employees, and share of the market. Through reading annual reports, talking to former employees, and checking resources in the library, a student can gain information on the reputation of the company, information that assists in the decision making process.

Preparing for an interview also means anticipating the dilemma of irrelevant or illegal questions. Students should be familiar with these types of questions and should know when the questions are considered to be illegal or irrelevant. Some of the most common illegal questions concern the applicant's age, religion, ancestry, proof of citizenship, education, any conviction or arrest. Irrelevant questions are those questions that are not substantially related to the functions and responsibilities for the position one is seeking. Examples of irrelevant questions which might be asked are, "Do you plan to marry soon? Are you planning on having a family? What does your spouse do? Is she or he subject to transfer?"

What options does the student have when confronted with such questions? Should one answer or decline to answer these questions? Should a student explain he/she realizes the question is not pertinent to the position as he/she understands it and ask how this question fits into the interview? Or should a student go ahead and answer all questions? Risk is involved in this situation no matter what one does. Before responding, the student

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must first assess the situation and assess the interviewer's attitude and personality. Has the interviewer innocently asked these questions? If this is the case, one risks embarrassing the interviewer by refusing to answer the question. If the interviewer appears to be "testing" you, however, asking for justification or refusing in an acceptable manner to answer the question could be a positive response. On the other hand, if the interviewer is simply "pushing for more information" from a desire for more information upon which to base a decision, then a "wrong" response could negate an interview that had been positive to this point. The best way to handle illegal or irrelevant questions is to anticipate such questions and prepare one's answers beforehand. In this way, a student in an interview is less likely to use poor judgement or to be disturbed by the questions.

CONDUCT DURING THE INTERVIEW

Supplementing the resume can help to ensure a good interview. Remember whatever information is included in the resume is open or is subject to questioning. However, because resumes must be concise, the interviewing process allows time to reinforce the resume and to bring out information not on the resume. Bringing along an extra copy of the resume can be a good idea; it could produce an image of professionalism. Also, encourage the student to bring samples of any relevant research or hobby to demonstrate how any past experiences can fit him/her into the organization.

A student should realize that a professional posture is imperative when talking to members of an interviewing team. Everyone they meet, i.e., the secretary, personnel, or management people, will be a part of the interviewing team; so, it is important to learn names, job titles, departments, and job functions.

Learning non-verbal communication skills or body language can also have a strong influence on insuring an effective interview. Give the student these recommended tips: be on time for an interview, the interviewee should wait until asked to enter the room, then should, with assurance, approach the desk of the interviewer but should not put anything on the desk or violate the space of the interviewer (no closer than 18 inches; no farther than 4 feet). A firm handshake and an agreeable smile are necessary non-verbal communications to begin a good interview. The interviewer should indicate where and when the interviewee is to be seated. Other non-verbal skills to consider are to make and keep eye contact during the interview, but don't stare as this can be intimidating; actively listen to what is being said; take advantage of silences to sum up, to pose questions, to evaluate; use well the time allowed for the interview; and when the interviewer indicates the interview is over, use the same leave-taking communication skills as arrival skills.

Guiding the interview to a positive conclusion is another factor for the students to consider. A good interviewer may assess one in the interviewing process by creating an open climate and by offering positive reinforcement. Some interviewers do this by being business-like and somewhat formal; others achieve a positive atmosphere by being informal and more cordial. On occasion, however, one runs into a bored or indifferent interviewer. It becomes important for the interviewee to guide the interview in this case. This can be achieved by discussing one's knowledge of the company, qualifications for succeeding in the position, interest in the company and the position, and willingness to work long or odd hours.

Planning for such contingencies can relieve some of the stress and nervousness brought on by a poor interviewer and can keep alive the prospect of obtaining the position. One option when the interviewing climate is not positive is for the student to state the importance of the interview to his/her career goals and ask to be given a chance to obtain the job. Some interviewers would be impressed, apologize perhaps, and give a good interview if this type of appeal were made. Others might react negatively. Another option is "to let things be." Choosing between the options depends on how one assesses the situation. In any case, don't shut the door on an interview; instead leave the interviewer with the knowledge more discussion is desired in the future.

FOLLOWING UP AFTER THE INTERVIEW

Following up after an interview is a step too often overlooked by applicants. Following up a good interview allows one to consolidate the gains made during the interview. If an interview has been successful, a brief follow-up letter should be sent touching on the positive points brought out in the interview and close with the statement that you are looking forward to the opportunity to becoming a part of the organization. Such a letter should reinforce one's interest in the job and reaffirm one's sincere desire to learn. Also, this affords an opportunity to bring any new information to the interviewer's attention.

Finally, if an interviewing session has not gone well, encourage the student not to give up. A letter to the interviewer or to another person in the organization reaffirming one's interest in the position could lead to a positive outcome. Placement offices or libraries are excellent resources to find the names of people and their positions in organizations.

Because a good interview is usually necessary to getting a job, thorough preparation will help to ensure that the interview is an effective one, and thinking through and planning ahead are the best means to ensure this outcome.

WRITING AND EDITING STEM

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The Writing and Editing Stem again had an overwhelming response to the call for papers. The resulting program is a blend of practical workshops and intellectual panels, with a poster session. We were exceptionally pleased to be able to present many first-time speakers and workshop leaders.

In order to bring a broad range of experience to the stem, we have selected presentations from leaders in business, industry, education, and government. Two areas received special emphasis. The first, workshops, reflected a growing philosophy of the convention as training with direct job application. The second, technical writing careers, reflected our concern with the present state of the economy and the feeling that we all need to expand our technical skills in order to compete in an increasingly crowded job market.

The panel discussions cover topics including the "Hero/Team Approach to Writing," "Successful Documentation," "Texts Editing," "Definitions," "Case Study Analysis," "Writers/Editors in Public Relations Roles," and an intellectual fantasy called "Through the Looking Glass." Our large sessions include "Technical Writing as a Career," "Strategy for Professionals Who Write," "Interpersonal Relationships," "Audience Analysis, and Far Horizons," a session about technical writing in foreign countries. Additional panels include "The Voice of Tech Writing," "Military Writing/Editing," "Improving Texts," "Publication Usability," and "Organizing Texts."

We were especially proud to include six workshops, "Make Your Next Proposal a Winner," "Grant Writing Tips," "Role Playing," "A Gaming Situation for Writers and Editors," "Analyzing Your Writing Style," and "The Need to Know: The Way to Go."

It all adds up to a total of eighteen panels and six workshops. Plus, a poster session from IBM about the "Need to Know: The Way to Go."

The stem offers something for everyone. From how to do the job better to how to open up new possibilities for employment. From the daily task of what to do on the page to the philosophical analysis of writing and editing.

Now, it's time for that magical trip through the world of technical writing and editing. . .

MAKE YOUR READER THE HERO OF YOUR HOW-TO STORY

Morris Dean
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IBM Santa Teresa Laboratory
555 Bailey Avenue
San Jose, CA 95150

Writer, editor, teacher

Previous ITCC papers: "Techniques of Creative Technical Writing and Editing" (1976) and "Using Experimental Psychology in Technical Writing" (1981)

Dear Uncle Moe, *I'm starting to write a how-to manual, but I wouldn't want to imitate most of the technical manuals I've seen. They aren't very inviting; some actually repel me. Can you give me some advice?*
Dear Merryade, *Have you looked at any popular how-to books? They're pretty inviting. They address readers directly and provide scenarios and anecdotes to help readers picture themselves doing the described actions. The writers of these books make the reader the hero of the story.*
Dear Uncle Moe, *What do you mean, the writers make the reader the hero of the story? Can you give examples?*

Dear Uncle Moe, It was great to visit your family while I was in Boston for the technical communication conference.

Thanks for your views as an editor and technical writer. But I'm not sure why I should make the reader the hero of my how-to story, or even if I understood exactly what you mean by that. I began writing a computer programmer's guide this summer, and, quite frankly, it seems to me and to the other technical writers here that if we get the facts straight, and clear, and in the right order, then our readers will do fine. What's this about making them the hero of the story? What story?

Your Niece, Merryade

Dear Merryade, I used the word "story" to indicate an analogy between fiction writing and how-to writing. Fiction, typically, is a story about people. But so is how-to writing—even if it is highly technical.

After all, a programmer's guide isn't about a program: it's about a person—the reader—doing programming. A guide for trouble-shooting nuclear reactors is about the reader doing trouble-shooting. The trouble-shooter had better be able to get into trouble-shooting, or the rest of us might be in big trouble.

But the analogy goes further. A fiction story isn't just about its hero; when we vicariously experience a story through identification with the hero, then the story is, in a sense, about us. We *like* such stories. You yourself told us at dinner while you were here that you were unable to read a novel on your flight from San Francisco, because you couldn't identify with the characters.

It's the same with how-to writing. When I'm reading, if I can't relate the information to myself, I lose interest. If I can't see myself doing the how-to-do, it's useless to me. And the more easily I can get into it, the better I like it. I'm sure you're the same way!

Have you read many popular self-improvement books, those printed in the millions of copies that stay weeks on the bestseller lists? Recently I reread *The Memory Book,* by Harry Lorayne and Jerry Lucas. They really bring their readers into the story. About 3/4 of their paragraphs explicitly involve the reader. They say "you" and "your," they use verbs that denote reader actions, they use the imperative mood, they ask questions:

> Assume you wanted to memorize these ten items, in sequence: airplane, tree. . .All right, picture an airplane in your mind. . .
>
> . . .Try to think of the items before you read them in the paragraphs to follow. Now, think of airplane for a moment. What does that remind you of? Tree, of course.
>
> . . .How did you do?

The authors have built a little story—a scenario—around "you." For three pages they unfold an exercise, to memorize ten items in sequence. The exercise not only illustrates the memory technique of associative linking, but also gives "you" practice using the technique.

Happy First Day of Fall, Uncle Moe, I begin to see what you mean by "story." The bookstore didn't have *The Memory Book,* but I found a Travis McGee (by John D. MacDonald) that I hadn't read, *Free Fall in Crimson.* Have you read it? When Meyer comes to the door with Grizzel right behind him dressed up as an old man, with a large-caliber derringer pressed to Meyer's back, and Travis McGee narrates. . .

> I unlocked the door, and just as I swung it open, the delayed warning hit me. There had been something wrong about Meyer.

. . .my stomach became sick, the same as Travis's. MacDonald really brings me into the story. Of course, no how-to writer could bring her readers in even half as much as MacDonald does.

Hold onto your hat, Uncle Moe, You may get this letter the same day you get my previous one. But I have to tell you about something. I went to the bookstore again, where I found Herb Cohen's how-to book, *You Can Negotiate Anything*. Look at the way it starts!

> 1. What is negotiation?
>
> Your real world is a giant negotiating table, and like it or not, you're a participant. You, as an individual, come into conflict with others: family members, sales clerks, competitors, or entities with impressive names like "the Establishment" or "the power structure." How you handle these encounters can determine not only whether you prosper, but whether you can enjoy a full, pleasurable, satisfying life.
>
> Negotiation is a field of knowledge and endeavor that focuses on gaining the favor of people from whom we want things. It's as simple as that.
>
> What do we want?

That was enough to make me buy the book, but I actually read most of it at the shelf. It was "over 4 months on The New York Times bestseller list."

By the way, Cohen uses scenarios too, with his reader—me!—as hero. Every bit as exciting as a Travis McGee. Never thought I'd see the day.

Dear Merryade, Thanks for telling me about the Cohen book. I'll be sure to get a copy. In the short passage you quote, he says "you," he uses verbs that denote actions by the reader, and he asks engaging questions. The question, "What do we want?" reminds me that motivating readers boils down to identifying what they want and showing them how to get it.

And did you notice the "we" in Cohen's question? "We" stands for "you and I"—it too brings the reader in, by suggesting a bond between the reader and the writer.

Cohen has obviously written a book that people want to read, and, from the way he begins the book, it looks as though one of his secrets is the "you viewpoint."

Dear Uncle Moe, Today I looked at the stuff I've been writing. I wonder if anybody would *want* to read it?

Dear Merryade, Your question is provocative. Most technical manuals look as though the writers never intended that anybody should actually *want* to read them. If anything, the writers seem to have tried to make the material look "serious," "professional," and "objective." But it is cold, passive, and impersonal:

> The system must be initialized. To do this, the START command is used.

You know the sort of thing. Passive voice. Not a person to be seen anywhere. Little attempt to indicate why the reader would want to do the implied action. This kind of stuff seems not even to have been written by a person!

Ironically, readers of this kind of writing really *are* heroes. (They have to be, to put up with it!) But few readers are so heroic. They prefer to ask a human being how to do something. I'm like that myself. When I started out as a programmer years ago, I tried at first to find what I needed in the manuals. But I soon learned that it was less frustrating to go ask a senior programmer.

Dear Uncle Moe, I'm discouraged. I've discussed your ideas with two other writers at work, and I showed them Cohen's book. But they essentially said, "So what? We don't write about the same sort of thing Cohen does." The "it-won't-work-here" reaction.

This bothers me, because I'm not yet convinced myself that it's possible to make the reader a hero in a technical manual. I've decided, though, that there's only one thing to do: try it! I've picked a chapter to rewrite.

It's going to be a lot of work, though. I'm afraid that my programmer's guide looks a lot like "the system must be initialized." Wish me luck. And do you have another book you can recommend?

Dear Merryade, You'll make your own luck. Show me how your revision turns out.

Happy Halloween! It's beautiful in New England: the pumpkins, the countryside all orange and yellow and gold and red.

PS: I'll browse through my collection of how-to books. But remember, you found Cohen on your own.

Dear Uncle Moe, Halloween was fun. Thanksgiving next week. The time has really flown since I began rewriting my programmer's guide.

Here for you to compare are one of my original passages and my revision of it. (I'm a little embarrassed to show the original to you now, but I used to think it was pretty good.) See what you think:

(original)

> The DO statement, and its corresponding END statement, delimit a group of statements called a *do-group*. All the statements in a do-group are treated as a unit by the computer. They are "done" together.
>
> A do-group can be placed in an IF statement, in either the THEN or the ELSE clause. For example:

```
IF A=B
   THEN DO. . .END
   ELSE DO. . .END
```

> If A equals B, the do-group after THEN is done; otherwise the one after ELSE is done.
>
> The DO statement can specify repetitive execution of the do-group. The repetition can be controlled in different kinds of ways, such as up to a certain limit, while a certain condition holds, or until a certain condition occurs:

```
DO I = 1 TO 10. . .END
DO WHILE (A=B). . .END
DO UNTIL (A=B). . .END
```

(revision)

What is a *do-group?* It's a group of statements that you set up to be "done" together, as a unit, by the computer. To set up a do-group you use the DO statement and a corresponding END statement.

You can put a do-group in an IF statement, if you want a group of statements to be done only under certain conditions. For example, you might code:

```
IF A=B
   THEN DO. . .END
   ELSE DO. . .END
```

If A equals B, the do-group after THEN is done; otherwise the one after ELSE is done.

If you want a do-group to be done repeatedly, you can say so in the DO statement. And you can control the repetitions in different ways. For example, you can repeat up to a certain limit, while a certain condition holds, or until a certain condition occurs:

```
DO I = 1 TO 10. . .END
DO WHILE (A=B). . .END
DO UNTIL (A=B). . .END
```

I'm sure the revision is better, but I feel there's still something missing. What do you think?

PS: Uncle Moe, what are you doing for Thanksgiving? I'm visiting Mom and Dad.

Dear Merryade, Thanks for telephoning us yesterday. Yes, it would have been nice to have turkey together.

I agree that your revision is better. What I think is missing is motivation. "You" alone won't supply it.

And though your opening question, "What is a do-group?" helps, it doesn't really motivate me. It assumes I'll be curious about something for its own sake, but what I'm really curious about is how it can help me. *Why* would I use the DO statement? If you tell me the reasons—and they're relevant to me—I'll be motivated.

Gripping fiction motivates readers. Towards the end of a Travis McGee, as the villain closes in, readers get wrapped up in the strongest motivation, the desire to stay alive. How-to writing, also, must motivate its readers.

I've found another book you can learn from. I hadn't read it in years. The book was first published in 1936, and my copy is in the 105th printing!!! It's Dale Carnegie's *How to Win Friends and Influence People.*

I remembered vaguely that it had lots of anecdotes, but I'd forgotten that it even begins with one:

> On May 7, 1931, New York City witnessed the most sensational man-hunt the old town had ever known. After weeks of search, "Two Gun" Crowley—the killer, the gunman who didn't smoke or drink—was at bay. . .
>
> . . .Nothing like it had ever been seen before on the sidewalks of New York.
>
> . . .Police Commissioner Mulrooney declared that the two-gun desperado was one of the most dangerous criminals ever encountered in the history of New York. "He will kill," said the Commissioner, "at the drop of a feather."
>
> But how did "Two Gun" Crowley regard himself?. . . "Under my coat is a weary heart, but a kind one—one that would do nobody any harm."

What conclusion does Carnegie draw from this? "There you are; human nature in action, the wrong-doer blaming everybody but himself. We are all like that."

We all have something in common. What *readers* have in common is that, whether they are reading a self-improvement book, or a manual about how to do something highly technical, they really want to be "reading about themselves." They're reading to learn how to do something they didn't know how to do before—whether they're trying to find out how to win friends and influence people or how to use do-groups.

Merry Christmas, Uncle Moe, Sorry I haven't written. I took your comments seriously, so I've had my work cut out for me. But it has been exciting. And it kept me inside where it's warm. (We Californians think it's cold when it frosts.)

You already saw my manual before I used "you" and asked questions. Now I believe I'm *really* thinking of my manual as a story and the reader as its hero. I've turned the previous passage into a story, a scenario about developing a payroll application:

(second revision—scenario)

You will frequently need to tell the computer to do a series of steps only under a certain condition. What about your payroll program, for example? You calculate the pay one way for employees paid greenbacks per week (salaries), another way for those paid dollars and coins per hour (wages). That is,

```
IF EMPLOYEE='SALARIED'
   THEN [do this]
   ELSE [do that]
```

How do you specify the "do this" group and the "do that" group? Simple. Start with DO, end with END. These statements tell where your *do-group* begins and ends:

```
IF EMPLOYEE='SALARIED'
   THEN DO [this] . . .END
   ELSE DO [that] . . .END
```

You will often find it useful to have a do-group executed over and over. For example, in your report on overtime figures, your manager may want to see the ten highest numbers of overtime hours for the week. To provide this information, you could have a single pair of READ and

PRINT statements executed ten times. Just say so in the DO statement:

```
DO COUNT = 1 TO 10
    READ [time record]
    PRINT. . .
END
```

Similarly, you will sometimes need to repeat a do-group while a certain condition holds:

```
DO WHILE (FICA<LIMIT)
    . . .
END
```

or until a certain condition occurs:

```
DO UNTIL (FICA=LIMIT)
    . . .
END
```

Happy New Year, Merryade, I like your revision! I'm drawn to read it. Almost any working person could relate to a story about such an everyday thing as the payroll. You've gone beyond just using the word "you." You've suggested a concrete reason why I, the reader, might use the DO statement. It motivates me.

However, I don't think your "greenbacks per week" and "dollars and coins per hour" work. I like what you seem to be *trying* to do: engage my senses with tactile images—the snap of crisp new bills, the weight and jangle of a handful of coins? But these images seem forced. Perhaps it's because neither salaried employees nor wage earners are actually paid in cash much anymore. And salaried people aren't necessarily paid in whole dollars, as you suggest.

Have you shown your revision to those doubting Thomases at work?

Dear Uncle Moe, No, I haven't shown the revision to the others yet, but my boss is looking at it. (She looks at everything.)

I'm glad that at least you saw what I was *trying* to do with the greenbacks and coins. I was trying to follow John D. MacDonald's advice, when he said that if a writer described a setting in enough detail to convince the reader, the reader would supply the rest. Like the way you supplied the snap and the jangle. I think that so much technical writing is dull because it doesn't give us enough imagery to relate to imaginatively. I guess the trick for the writer is to find a natural way to include the imagery.

By the way, did you make any New Year's resolutions?

Dear Merryade, Yes, I made some resolutions, and I've already acted on one: I've read Cohen's *You Can Negotiate Anything*. It *is* good, even entertaining. How many technical writers *seek* to give their readers pleasure?

I was struck by Cohen's use of stories, most of which are anecdotes about himself and others rather than scenarios about the reader. (About half his paragraphs are anecdotal.) I finish reading the Cohen book with a feeling that I know that guy and his wife and some of his friends. And I like them; I can identify with them. In that sense, the book is about me.

That's really a lot like fiction: Cohen and his wife, as characters we know only through a book, are no more "real" than Travis McGee and Meyer. And I suspect that Cohen made up some of those "true" stories about himself, or at least made them over a bit, like most non-fiction writers. And that's fine. Realistic conversation can be deadly dull to read in a book; made-over conversation can be quite interesting.

Hmmm. You know, Merryade, even the *reader* is fictional. We don't know all those strangers out there who are going to read our story. I'll make another New Year's resolution: to think about this some more.

Dear Uncle Moe, Ta-dum-da-DUM! I didn't think this would happen for a while: I've been promoted.

My boss read my manual and said it "felt" different. She said it's what we should be producing around here, and she's making everyone else read it.

I also showed her the Cohen. She wants everyone to read it too. I'm looking for a copy of *The Memory Book* and *How to Win Friends and Influence People.*

Happy Valentine's Day, Merryade, Congratulations! You set out to interest your readers, and you've interested your boss as well. *You* have become the hero.

If you can't find the books I mentioned, I'm sure there are other popular how-to books just as useful.

Happy First Day of Spring, Uncle Moe, Remember what you said about Cohen being no more real than Travis McGee? You know, it's the reverse that's important: Travis McGee is no less real than Cohen! I mean, even though I know MacDonald made up the McGee story, it still seems true to me.

There's something here for technical writers. Suppose, as you suggested, that Cohen did make up some of his anecdotes. So what? They don't *seem* made-up.

Last night I got to thinking—if some technical writers happened to read our correspondence, it would seem to them like a story. I mean, to them you and I would be fictional characters. They don't know either of us any more than they know Travis McGee. I was wondering, Uncle Moe, whether you and I would be real enough for this to be *their* story?

THE END

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THE ENGINEER/WRITER TEAM APPROACH IN PREPARING A TECHNICAL PAPER

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ABSTRACT

Technical papers are usually written by engineers and scientists. This paper discusses a different approach for paper preparation, in which the engineer works with a writer. The engineer supplies information, which can be a detailed outline, other reports on the same subject, or verbal communication to the writer, who then actually writes the paper. This engineer/writer team approach is a productive and rewarding one. The engineer's preparation time is significantly reduced, while high quality technical papers, intelligible to those previously unfamiliar with the details of the engineer's work, are produced.

INTRODUCTION

Most companies encourage their engineers and scientists to present technical papers at conferences. These papers are usually written by the engineers themselves. This approach can have several drawbacks. Writing a paper takes time--time that the engineer may not be able to spare or that may be spent more productively on other projects. In addition, an engineer may be too involved in work to be able to write a paper that is easily understandable to an outsider or to write one that deals with only a small part of a topic.

A better approach is for the engineer to work with a writer. An engineer/writer team approach can produce papers of high quality while significantly reducing the amount of time the engineer must spend writing. Also, because the engineer explains the material to a non-specialist during the paper's preparation, this approach often results in a paper that is more intelligible to other non-specialists.

METHODS OF PAPER PREPARATION

There are many ways in which the engineer/writer team can produce a technical paper. Most of these procedures can be summarized as follows: the engineer provides input; the writer uses the input to write the paper; the engineer reviews the paper and, if necessary, revises the writer's product.

The input from the engineer may take many forms:

- A detailed outline
- Previous reports or papers
- Verbal communication
- Unformatted transcribed dictation (i.e., the engineer's thoughts in a "stream of conciousness" form)

The input will also include information obtained from meetings between writer and engineer.

The above list is by no means complete. Other, similar methods can be devised to fit specific situations.

GETTING STARTED

The first step in technical paper preparation is the transfer of information from the engineer to the writer. Occasionally, preliminary talks are needed in which the writer explains to the engineer what kind of information is required and how the procedure is to work. Preliminary explanations are especially necessary if the engineer is skeptical about using this team approach.

The detailed outline is the most common form of initial input; I shall use such an outline as a starting point in this discussion of paper preparation. Although other methods of preparation may start from a different point, they proceed in a similar fashion.

The outline should be detailed. It should show the paper's organization and should provide some information on various subtopics to be discussed. The entries should be sentences or phrases, not simply a word or two. A good rule of thumb is that an 8 to 12-page paper requires a 1½ to 3-page outline.

The writer and engineer should get together for an initial or kick-off meeting. The engineer may provide the outline before the meeting or at the meeting. If the outline is provided at the meeting, the first thing the writer should do is read it.

The writer should have two main objectives for the kick-off meeting:

- To determine the main point around which the rest of the paper revolves
- To obtain enough background information on the paper's subject to have at least a basic understanding of the paper

Detailed outlines can supply many facts about a paper. Unfortunately, there are often so many facts that the writer can't see the forest for the trees.

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The outline--and hence, at this point, the paper--is a jumble of facts without a focus. Before proceeding with the paper, the writer has to determine its main point or focus.

The focus must come from the engineer. It can be extracted in one of two ways. The easiest way is for the writer to simply ask, "What is the main point you want to make with this paper?" or "What is the overriding impression you want to leave in the minds of your audience?" Alternately, if after looking at the outline the writer has a good idea of the focus, the question can be phrased: "It seems to me that the main point you want to make is ________." The latter approach is preferred, especially when the engineer is hesitant or indecisive.

During the initial meeting, the writer should obtain background information on the subject. Most of this information may not be included in the paper. However, background information aids the writer in understanding the logic of the paper and in deciding what should be included or deleted. If the writer does not have a reasonable amount of knowledge about the subject in question, much of the available writing time could be spent questioning the engineer on minor points. This would counteract the positive cost- and time-effective aspects of the team writing approach.

Here is an example to further explain the kind of background information needed to write a technical paper. Recently, I worked on an article on the computers used in power plants. I had some knowledge of power plants and of computers, but when I started the article I knew little about power plant computers. I therefore asked the engineer to provide me with background information. He told me why computers are used, and explained what had been used in the past. He outlined the functions of computers in a power plant, and told me which parts of a power plant people were unwilling to computerize, and why. Only a small portion of this information was actually written into the article, but the remaining information enabled me to understand the subject well enough to write the article.

Though one might think that engineers would be unwilling to spend much time explaining all the details of their work to a non-specialist, the opposite is usually true. Most engineers love to talk about their work, and about how it fits into the current state of affairs in the industry. Few are hostile to the engineer/writer team approach, especially if the writer appears interested. The writer can ask just enough questions at the initial meeting to shape the engineer's description to the paper's needs, and can thus obtain the required background information with relative ease.

The kick-off meeting is also the appropriate place for the writer to ask about the paper's intended audience and thus determine the level at which the paper should be written.

At the kick-off meeting, only a few specific technical questions relating to details should be asked. This type of question is normally held until the second meeting when the writer should know more about the subject.

WRITING THE PAPER

After the kick-off meeting, the writer prepares the first draft of the paper. The writer's most important objective in preparing the first draft is to organize the material and place it in the order in which it will appear in the final paper. This is often an easy task; the material will appear in the same order in the paper as it appears in the outline. On occasion, however, the writer will find that some information is not fitting into a logical pattern. If the writer is fortunate, he or she will make this discovery simply by looking at the outline. More often, though, the discovery is made after several hours of frustrating attempt to understand how the material should fit.

The writer has several options if the material is not arranged in a logical pattern:

- Reorder the material.
- Prepare a new outline. If a major restructuring is required, this will be necessary. A note of caution: if the writer makes significant changes in the paper's structure, the outline should be shown to the engineer before the first draft is written. This "safety check" can save hours of work and immense frustration for the writer by giving the engineer the opportunity to disagree with major changes at a preliminary stage of writing.
- Ask the engineer how the material should be arranged. This approach may be necessary if the outline is so confusing that, even after hours of thought, the writer can't tell which end is up. However, asking the engineer is a last resort method. The writer's best approach is to write either a draft or an outline in the best way possible, then let the engineer make changes in the order of the material's presentation.

In preparing the first draft, the writer should write as much of the paper as possible, noting questions and leaving gaps where further information is required. The paper should be based on the outline, on the information obtained during the initial meeting, and on the writer's knowledge of the subject. The writer may also use any reference sources or background materials with which he or she is familiar, or those recommended or supplied by the engineer. The engineer remains the primary reference source.

The writer should not call the engineer every time a question arises, nor should the writer call the engineer with a dozen questions. Instead, the writer's questions should be written down and saved for the next team meeting. The writer may find answers to some of these questions as the writing proceeds.

The writer may find, in addition to questions that need answers, many points that should be "fleshed out" with more details or an example. Again, the writer's strategy is not to immediately ask the engineer for more details but rather to leave a gap for the engineer to fill in after the entire first draft is completed.

After the first draft has been completed, a second meeting between engineer and writer is scheduled. This is usually an extensive meeting, and can last from an hour to most of the day. At this point, the writer should--from reading, writing, and thinking about the subject--know more, and should be able to ask more pertinent questions.

The writer should ask questions to determine the audience's frame of reference. For example, the writer may ask, "Should we explain that, when flange X rotates around shaft Y, piece A undergoes tension?" The engineer may agree; then again, he or she may say, "Any mechanical engineer knows that." If the paper is to be presented at an American Society of Mechanical Engineers Conference, further explanation is unnecessary. However, if the paper is to be given at a conference of utility executives, the writer may want to point out that these executives may not be mechanical engineers. Remember: The engineer is always right--or, at least, has the final word on what goes into the paper.

Depending upon the state of the paper, the writer may want to show the paper to the engineer at this second meeting. This is often a good idea because the engineer, on seeing what the outline has grown into, may have some relevant comments on organization, writing level, or content. These comments can save the writer some work and result in a smoother second draft.

THE "FINAL DRAFT"

The next step is for the writer to prepare the second draft of the paper. I call this next draft the "final draft", not because it is final (it is not; it will be changed during the review cycle) but because from the writer's point of view, it is essentially complete. The writer has done all he or she can do with the paper, at this point. The ball is now in the engineer's court.

There are two important points to keep in mind concerning preparation of the final draft. First, it is fine for the writer to leave blanks for the engineer to fill in. Second, it is more efficient for the engineer to correct minor technical errors during the review cycle than for the writer to spend hours puzzling over each minor point. Therefore, if the writer feels reasonably certain about the accuracy of a statement, he or she should write it that way. If the statement is wrong, the engineer will fix it later. It is essential, though, that the writer indicate to the engineer any such questionable points.

The writer should limit calls to the engineer at this phase of the team effort. While it is acceptable for the writer to call the engineer with a few minor questions as the writing progresses, another lengthy meeting should be avoided.

When the final draft is complete, the writer should return it to the engineer, in person. This gives the writer an opportunity to bring certain points to the engineer's attention, including gaps or marginal notes. The writer should tell the engineer the type of information that should be placed in each gap.

The engineer will often make changes or additions. Most of these alterations will be additions; the engineer may wish to cover a subject in more detail, or add an example to illustrate a point. If the engineer wants to make numerous additions, he or she may meet with the writer and request that the writer make the changes. In that case, the writer will again follow the steps for preparing a final draft. The engineer may also change the writer's words, but this is infrequent unless the writer has made a technical error. Almost always, the engineer will defer to the writer on points of style.

What happens next must be decided on a case by case basis. If the engineer and the members of the management review cycle that must approve the paper are completely happy, the writer's job is done. If changes are required, the engineer may make them or may request the writer's help. No matter what the situation, the writer should be willing to see the paper through the review cycle, if necessary.

TABLES AND FIGURES

Tables and figures lead a double life in technical papers. In addition to being part of the paper, they usually become slides. While most tables and figures come from the engineer, the writer can help in the following ways:

- The writer can suggest new tables and figures or improvements to existing tables and figures, or can suggest deleting certain tables or figures.
- The writer can, in fact should, read through the paper, looking for material for possible slides. Engineers often have an inappropriate number of slides to support a presentation, and are unwilling to spend time for adequate slide preparation. Many engineers are, however, receptive to a writer's suggestions for new slides.
- A good table or figure for a paper does not automatically make a good slide. Often, it is too cluttered. To save time, engineers may make slides of these tables and figures anyway. The writer can clean up these slides, suggesting appropriate changes to the engineer.

CONCLUSIONS

The engineer/writer team approach to preparing a technical paper is a productive and rewarding one. It allows production of a high-quality technical paper while reducing the time an engineer must spend on its preparation. This approach is also much more rewarding to the writer than is the process of cleaning up the language of a finished paper. The team approach is challenging and can be difficult, but the gains justify the effort.

MAKE YOUR NEXT PROPOSAL A WINNER

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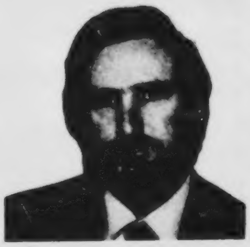

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Writing a winning proposal is not unlike winning at a game or sport: it takes a combination of knowing the rules and having (or developing) the required skills.

Since proposals are written documents, knowledge of the rules of written communication--together with skill in applying these rules--are obviously essential elements. But good writing alone is not enough to make a proposal a winner. It also takes knowledge of the specific rules of proposal writing, plus enough practice to develop skill in applying them.

This workshop focuses on some of the most important--and yet most ignored--rules for writing winning proposals: those that apply to the advance-planning stage. These rules shape the strategies you develop and the actions you take not only before the writing begins, but, ideally, long before the Request for Proposal (RFP) ever arrives at your doorstep.

For example, you need to be aware of exactly what the proposal document can and cannot do. Even the best-written proposal cannot substitute for doing your marketing homework, for developing a superior technical approach or design, or for costing your product or service competitively. However, a poorly thought out, poorly written document can lose you the contract, despite your best marketing, technical, and costing efforts.

You also need to be aware of some of the critical aspects of proposal evaluation: what kinds of people serve as evaluators, how they approach the evaluation task, and how the scoring system works--to name just a few.

There are important factors to consider in making the bid/no-bid decision--factors such as whether the projected business opportunity is a real one, the likelihood of your winning, and the profitability of a win. Good proposals are not cheap to prepare, and if you dilute your resources (both the monetary and the human ones) by responding to every RFP that comes in the door, you will not be able to do an effective job of responding to the really critical ones.

Another important step is the development of win strategies and "themes" (responses to the question, "Why us?"). A set of well-thought-out, powerful themes, carefully woven throughout the document, will do much to increase the persuasive power of your proposal. Because themes are such a critical element of a well-written proposal, the workshop includes a special exercise in theme development.

Finally, there are several steps you can take during the pre-RFP period that will give you a head start when the RFP arrives. These include such actions as selecting the proposal team, developing an outline and schedule, making key packaging decisions (e.g., cover art, binder selection, use of dividers and tabs), and preparing for the proposal kickoff meeting. To help you track your progress through these items, we'll furnish you with a pre-RFP checklist.

Proposal writing will never be easy. (Neither is winning at the Olympics--or the World Series!) But a thorough knowledge of the rules, together with practice in applying them, will help you make your next proposal a winner.

PLAIN TALK ABOUT TECHNICAL WRITING
FOUR STEPS TO SUCCESS

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The days of depersonalized, technology-laden documentation are over. The age of the user is here. User-friendly documentation is good writing practice in use. The objective of user-friendly publications is to attract the reader, to make the reader want to read the document, and, once it has been read, to have the reader understand what has been said.

When we worked in customer support, we taught people to use the product they had just purchased. In retrospect, we see many advantages in working directly with people.

This paper explains what we learned while working with customers and how we applied these lessons to the task of writing user-friendly publications.

Writing user-friendly publications replaces expensive one-on-one customer support. That is not to say that good publications are cheap. They aren't, not if they are going to meet the customer's needs. How do we write user-friendly publications? By using common sense mostly; and also by using basic good writing practices. In creating user-friendly publications, there are four main steps:

- Identify what, why, and who.
- Plan and outline the publication.
- Write the publication to fit the task and the reader.
- Ensure success through responsible research and reviews.

IDENTIFY WHAT, WHY, AND WHO.

When we were in customer support, we understood the product that we taught customers to use, we knew the business environment in which it was to be used, and we knew the educational level of the people who were going to use the product. Therefore one of the first things required in technical writing is learning about the what, why, and who.

- About what product will we be writing?
- In what environment will the product be used?
- At what educational level is the expected average user?

What?

We, as technical writers, read the specifications, talk with the sales personnel, analyze publications for a similar product, evaluate publications about similar competitive products, and talk with engineers and product managers.

Recognizing that different products require different approaches to documentation, we have developed a Product Profile form. The purpose of the Product Profile is to describe the marketing and support requirements. These requirements determine the size and scope of our tasks and must be made available in time to influence final plans and associated budgeting requirements.

To simplify gathering and organizing information, our Product Profile is a questionnaire (Figure 1). If additional information is required, additional sheets may be attached.

Why?

Why have publications? Publications provide the information needed by the readers. They explain the product, either the whole product or parts of the whole. They relate the user's job/task with the product. Through publications, we tell the reader how to fix the product, how it works, or how to use it. The answer to the "Why" question determines the type of publications we need to develop. For example, do we need to write a tutorial book, a repair manual, a reference book, a technical dissertation, or an operating procedures manual?

Who?

In customer support, the customers sat next to us when we were teaching them how to use the product. As technical writers, we find direct personal contact is a rare luxury. Therefore, we have to ask ourselves "Who is that person?" "Who is going to use this publication?" Different users require different vocabularies. We must recognize, early in the planning stage, the range of skills and reading levels so that the publications can be written at a level that fits the reader.

We estimate reading levels of expected users by completing and examining our Reader Profile form (Figure 2). It, like the Product Profile, is also a questionnaire. If additional information is required, additional sheets may be attached.

PRODUCT PROFILE

Distribution of this product.

___ U.S.
___ World wide.

Market for this product.

___ Medical
___ Financial
___ Agriculture
___ Retail
___ Education
___ Commercial
___ Wholesale
___ Food
___ Clothing
___ Industrial
___ Appliance
___ Government
___ Electronics
___ High Technology

General profile of the intended customer.

Size of the company ___________
Type of company ___________
Experience of the staff ___________

Competitive stance.

Vendor ___________
Model Number ___________

Level and scope of customer involvement in case the product fails and the corrective action available.

___ None
___ Routine maintenance
___ Other (Explain) ___________

What must the customer know about this product in order to use it? (Prerequisite knowledge.)

___ None
___ Experience with a similar product
___ Company sponsored school
___ Other (Explain) ___________

When is this product to be made available for sale? (Due date?)

____

Figure 1. Product Profile.

PLAN AND OUTLINE THE PUBLICATION.

After the what, why, and who questions have been answered, the stage is set for planning the outline. We assemble the sections in their functional order by placing the section containing the most frequently used procedure first and following those with the sections containing the procedures that are performed weekly or monthly.

We plan and develop a vocabulary that means something to the expected user. We plan to have our vocabulary tie the words to the task to be performed. For example, instead of INPUT DATA or DATA INPUT, we write ENTER THE SOCIAL SECURITY NUMBER or ENTER A NEW CUSTOMER or HOW TO CHANGE AN ADDRESS. We use the same vocabulary throughout the publication; and we strive to be consistent. The vocabulary must meet the reader's level of understanding. We plan to achieve that objective. Useability is also kept in mind. We plan for:

- Short sentences.
- Simple words.
- Appropriate page format and type size.
- Effective headings and titles.
- A list of illustrations.
- An operator troubleshooting/corrective action section.
- A glossary of terms.
- A subject index.
- Charts.
- Examples.
- "Coffee breaks" for the reader.

We also show in our plan how the illustrations are integrated with the text to accent and clarify information. Reflecting the outline of the table of contents, we plan to keep the functions separate and distinct and not to mix "apples and oranges." And we make plans for publication testing by the writer, by the technical staff, and by a user.

WRITE THE PUBLICATION TO FIT THE TASK AND THE READER.

Now the hard part is over. We have identified the market for the product and the audience who is going to use the product. Easy-to-find, task-oriented functions have been established. We have completed our outline. We know what we are going to write about, whom we are going to write to, and the sequence in which we are going to say what we have to say.

When we worked personally with customers, we found out their backgrounds, learned how they felt about the product, identified their patterns of speech, and listened to their ideas. We looked them in the eye and knew if they understood. If they didn't, we tried again and said the same thing in different terms. We suggested that the product did not give "warts" to people and that operators could not break the product.

We suggested how the customers could best use the publications and got them involved in working with the product within their first half hour. When they became frustrated, we stopped for a cup of coffee.

READER PROFILE

General Information

Educational level

____ High School
____ Some College
____ College Graduate
____ Other ____________

Do you like to read?

____ Yes
____ No
____ Sometimes

What kind of reading do you like?

____

How long on this job?

____ Less than 6 months
____ 6 months or more

Do you like what you are doing?

____ Yes
____ No
____ Sometimes

Have you worked with this product or a similar product before?

____ Yes ____ No

Interest in this publication

____ Mild
____ Must use it to perform my job
____ None

Is there another source for this information (schools, cassette tape instructions, etc.)

____ Yes ____ No

Task Specific Information

Operator(s)	Tasks	How often performed
Primary	____	____
Secondary	____	____
Other	____	____

Previous similar experience ____________
____

Supervision required ____________
____

This is only an example of the type of questions that should be asked. The nature of the product determines the type of questions to ask. For example, the person buying a tractor needs different publications than the person buying a home video game.

A separate Reader Profile should be developed for each distinct task performed by another person.

Figure 2. Reader Profile.

From this experience, we found the publications should be written at a level lower than the general educational level of the target audience. People with limited education frequently have problems when they have to understand and use what they have read. Even the more skilled readers read and learn faster and more easily when the information is presented with a simple vocabulary. We have found that steps are easier to do if they are identified one-by-one instead of lumped into a paragraph.

We use an introduction that lays touchstones which the reader will meet again in the text. We include in the text everything the reader needs to know to perform the desired task. Furthermore, we present this information in the sequence in which it is to be performed. We lead the reader from the simplest task to the more complex task, so the reader gains confidence with each step. We use illustrations to accent and show (graphically) the meaning of the words of the text.

The ideal publication permits the reader to work with the product at the same time the text is being read and thereby gain experience with each turn of the page. This approach helps to eliminate the fear of "warts" or breakage.

Dealing with frustration is another area we have identified. One of the ways we deal with reader frustration is to "schedule a coffee break" for our reader, giving the reader stopping points that are clearly identified. Also, planned white space permits the reader time to contemplate the completed steps or those about to be performed. We do not overwhelm the reader with minute details, but are sure to include all of the necessary steps and ensure that those steps are accurate.

Including an operator troubleshooting/error message section is another way we help keep the reader's level of frustration low. This includes corrective procedures and identifies the cause of the error or problem. Examples of this are: how to replace a ribbon on a typewriter, how to load the paper on a printer, how to adjust the print location, and other common problems that the reader can remedy. Only as a last resort do we place the words "Call your customer representative" in the publication.

Another area of reader frustration is unfamiliar vocabulary. For this reason, we develop a glossary. The glossary is an easy-to-use reference list of terms explained previously in the text. The glossary also contains all terminology which the reader typically uses, even if that terminology is not used in the text. For example, "dipstick," "oil stick," and "oil gauge" all mean the same thing and should be in the glossary so the relationship is easily understood by the reader.

As the text is written, a glossary of terms can be developed on 3 x 5 cards. In customer support, we told customers where to find information. As writers, we give readers the table of contents, a list of figures, a subject index, and a glossary.

ENSURE SUCCESS THROUGH RESPONSIBLE REVIEWS.

The measure of our success or failure in customer support was the number of phone calls we received at the office after returning from a training session. We tracked those phone calls for about two months, learned where our weaknesses were, and then corrected those weaknesses. Now the review process takes the place of those phone calls.

No publication is complete until the review process is finished and the corrections have been inserted. We, as writers, are our own "first line of defense." We test our publications for accuracy and completeness. We need to double-check our own work rather than to abdicate our responsibilities to other groups, hoping they will catch all of our errors or omissions.

The technical review catches the omissions since it is concerned with the technical accuracy of the publication and not necessarily the spelling, punctuation, usefulness, and so on.

The editorial review is extremely helpful for the beginning writer. It corrects punctuation and spelling; improves clarity, consistency, and completeness; and prunes the turgid verbiage. This review can also include an evaluation of the publication reading level by using tests such as the Flesch Reading Ease Formula, Gunning's Fog Index, or Kincaid's Recalculated Flesch Index.

The real proof, however, is the user review. It is the acid test which finds the flaws in the publication. The user soon knows whether the publication is:

- Easy-to-read.
- Easy-to-use.
- Accurate.
- Complete.
- Consistent.

We arrange for a user review to be performed either in-house or at the customer's site. We can arrange it through the salesperson or through the product manager. Or we can take people off the street, who have never seen the product before, and have them test the publications for usability.

SUMMARY

It is through experience and common sense that each of us learns to create a better publication. Adding the "put yourself in the reader's place" attitude to common sense and experience makes each of us better technical communicators. Better technical communicators produce user-friendly publications.

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ED239276

SUBDIVIDING TEXT: HEADINGS, CONTENT AND COMMUNICATION

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The intent of this paper is to trace a specific method of organizing and clarifying textual content: the use of headings. Often overlooked by authors and style manuals, headings can serve a variety of communicational functions in technical writing ranging from simple identification of subtopics to narrative commentary. Concerns of the reader, together with bias in communications, are regarded as key problems for the dissemination of technical information.

INTRODUCTION

Memorable, mediocre or mind-numbing? Which best describes the readability of much technical information? Like the patient after anesthesia who feels a little groggy, we are often so immersed in technical or bureaucratic discourse that our linguistic sluggishness goes unnoticed. We have thoroughly assimilated, perhaps too well, sophisticated ways of evaluating and presenting complex information. The methods of the market, the organization or a scientific specialty tend to migrate from their natural domain and establish themselves as permanent houseguests in the area of communications.

This does not mean that communications is being overrun by inarticulate intruders loaded down with formulae and buzzwords. That notion unjustifiably discredits the original context of unfamiliar terminology and diverts attention from "fifth column" sympathies among the rank and file. (A related concern, the overall health of language and language arts is a separate, more comprehensive matter whose diagnosis is quite different.)

At the same time, no special assumptions are being made here about communications as a privileged activity, carried on through a glittering array of concepts, amazingly able to render obscure information into simple sentences with low syllable count. The point worth stressing is that technical communications is a very mixed practice, joining commercial, institutional, scientific, military and other influences. It should not be surprising, then, that printed and electronic text reflect those interests; nor is it strange that countermeasures be developed to compensate for limitations imposed by particular genres.

One of the more chronic complaints made about reading technical information concerns the sameness of the material, a homogeneity that contributes to a general lack of excitement. My first reaction to anyone making this comment is: think of the editor and writer, those unfortunate souls who regularly and successfully wrestle with proto-prose in its raw state. Rather than prescribing for the rehabilitation of dull writing, or searching for language that is apt to its purpose, both continuous jobs, it should be acknowledged that only so much can be done to relieve readers from their fatigue. The bulk of technical writing, being technical, is not going to read with the grace of Updike or Pauline Kael.

Added to this are the routine projections that information flow will continue to expand rapidly in all directions. The editorial presence will undoubtedly change as systems explain themselves to other systems and the collective appetite for information grows. Current confusion about the proper roles of writing, program design, editing and production will probably increase until installed technology remains in place long enough to mature. Regardless of how quickly things change, an eye for the subtleties of text and discrimination in language will be needed until that apocalyptic day when machine data is imprinted directly on cerebral engrams. Even then, an author/editor's functions will need to be performed by some person, or entity.

OUTLINE TO HEADING

There are other issues facing technical communications than can be briefly indicated here. But a cursory overview suggests that professional communicators will face challenges that require flexible and diverse resources. To offset the humdrum effect of dry reading, for example, it does help to organize material so as not to frustrate the audience needlessly or obscure the subject. This is often easier said than done, especially if standardized solutions discourage alternatives, or a specialization is perceived as ineffable, divorced from its legacy of discovery and cross-fertilization.

The manner in which a text is subdivided into parts can help or hinder comprehension. More is involved in text subdivision, or should be, than filling in sections of an outline. In particular, headings can be used to structural and expressive advantage with technical material.

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Manuals and style guides have little to say on the subject of headings, although considerable advice is available about the structure of a document or the preferred way to develop an outline. I do not believe that headings used in a planned outline necessarily serve the same purpose as those that eventually appear in the completed text. The casual transferring of headings from one context to another helps account for the lumbering pace of many technical works.

Working from an outline not only determines the structure of text, but can easily set the tone. An outline followed in spirit, as well as in form, had best be an exceptional document that can provide order with a minimum of disjointed or forced transitions. When an outline is treated as holy writ, headings are often used mechanically or inserted as an afterthought, while the writing itself further echos the original schema. The final appearance sometimes resembles the handiwork of a taxidermist: stuffed, static and undeniably dead.

Concerning headings, heads or head levels, reference works seem to regard their function as self-evident, judging from the scarcity of commentary about them. Otherwise a commonsense definition may be offered stating that (sub)heads mark definite divisions of a subject and should provide a reasonable clue to the contents of the text. That leaves a lot of room for variation—variation that can help provide the flexibility to improve the fit and finish of technical writing.

Rather than argue against overly detailed outlines, the purpose here is to offer a few ideas that can help convey an extra degree of vitality to the reader. Aside from writing and composition, there are other avenues of improving text, including graphic devices and visual arrangement, neither of which will be considered in this paper. Text headings offer additional possibilities, but before examining them it may be useful to situate the discussion with respect to selected research in text analysis and reading.

CURRENT RESEARCH

Research into the activity of reading is conducted from a multitude of orientations in psycholinguistics, communications and other disciplines. Reading itself can be subsumed under larger models of text processing which, in turn, may or may not be consistent with theories of knowledge processing. Other related research attempts to establish the key elements of textual meaning and coherence.

In recent years, emphasis has shifted from the identification of discrete units of language which combine to form larger structures to an investigation of the processes and interactions that take place as knowledge is acquired, stored and used. As a result of the change from naming elements to describing functions, there has been a fresh concern with the totality of linguistic operations and their human environment. The analysis of language as text or discourse, rather than visa versa, gives priority to meaning that is situated within the experience of the reader or speaker.

One implication for text evaluation is a theme of interdependence between reader and text. Reading is regarded as a participatory act during which readers actively engage in the construction of meaning in accordance with their previous knowledge and psychological disposition. This conception stands in contrast to earlier views of reading as passive assimilation of linguistic units. The revised approach has meant changes in instructional theory and, subsequently, text development.

Another consequence of the newer holistic paradigm has been the transition from rule-bound sentence building to systematic text design. Textual coherence has become a more explicit goal and is supported by a myriad of cognitive strategies. The planning of texts as communicatory structures, meshed with advanced technology and appropriate media, has produced innovative applications of programmed learning.

These two characteristics of language processing—text design and the cooperation of readers making interpretive choices—provide a basis for flexibility in matching text to audience. Text headings can be a significant part of that communication process.

READING HEADS

Headings subdivide and help organize text. As observed earlier, they are often simply lifted from sections of an outline and reinserted in the finished text. Alternative uses are apparent in many kinds of writing, including technical.

The following is a tentative grouping of heading types:

Headings

1. Descriptive
2. Reflective
3. Narrative
4. Rhetorical
5. Absent/Implied

These five general types of headings are differentiated by approximate function. Their use should seem familiar. The list is not meant to be conclusive.

1. Descriptive. This heading may be the most common. It describes the most prominent feature of a text section. As in a hierarchy, these headings tend to be straightforward and similar to one another in manner of reference. "Types of Headings" and "Current Research" are examples of the descriptive type.

2. Reflective. Headings of this type make a comment as well as provide identification. The presence of the author or editor is more apparent in the remark or judgement. Phrases from the text can be adapted to serve as reflective headings. "Jargon Is Everywhere" is an example.

3. Narrative. These headings mark the progress of the subject and may tell its story in condensed form. "New Entrants Give Marketing Push to Software" relates a phase of information from a section of text that gives the details. Many titles of this type can be compared with news headlines.

4. Rhetorical. "Through A Glass Darkly" "When Enough Is Too Much" This is a style that we are least accustomed to finding in technical writing. It usually presents an allusion or veiled argument. Rhetorical headings sometimes illuminate an idea instantly or lose the reader altogether. There is an enormous variety of expression possible with this type. In one sense, all headings are rhetorical.

5. Absent/Implied. A text without headings or one that is subdivided in strict minimal order—numerically, for example. I, II, a, b, c, 1, 2, 3, etc.

Combinations of heading types and mixtures of headings within a text add to the possibilities. Not every heading may be of a clear-cut type; the purpose is to provide a textual resource rather than a semantic recipe. Instead of speculating on which types of headings are best for which text material, it seems more appropriate to invite application and experimentation among writers.

MEDIA SEGMENTS

Just as text subdivision can be clarified when sufficient attention is given to headings, other media may also be well served by more effective division of the whole into parts. Any similarity among different media in this respect is open to debate, as is the relevance of procedures from one area being applied elsewhere. But with appropriate changes it seems reasonable that information presented through video, film and slideshow can demonstrate interactive qualities comparable to well-arranged text.

More elaborate methods of information exchange are being developed through interactive computer graphics. Increased attention is being given to user needs and abilities during software design and planning for automatic systems. These new environments, together with traditional media, offer prospects of better, more effective training, data handling and information transfer.

PRACTICE IS NINE-TENTHS

Some of the material presented here, both general observations and specific terms, may be useful to professionals who occasionally focus on these issues. Writers, editors, managers and technical specialists in related areas should be able to evaluate questions of text subdivision for their own situation, working through individualized approaches. Many of the preceding features are already widely incorporated in technical communications. Other text products would look better except for recurring organizational constraints, short schedules or detrimental habits.

It would be difficult to estimate the potential gains that could be realized in productivity, as measured by pragmatic comprehension of technical information, if concerns of the reader—as distinct from client, organization or developmental model—were assigned earlier priority. If the range of interest in problems of disseminating technical information displayed by these proceedings is a good indication, there should be many intriguing options opening into the interesting times ahead.

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REDUCING BY DESIGN: A CHECKLIST FOR EDITORS

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ABSTRACT

A number of graphic elements can be manipulated to reduce the length of a printed document, including trim size, type page size, column arrangement, type size, white space, and scale of illustrations. Such reduction by design is a useful adjunct technique for editors, particularly effective in combination with the usual editorial technique of reduction by cutting text. It can yield documents that are not only shorter, but also more effective.

Editors are often faced with the task of reducing the length of printed documents, sometimes because they are working within the limitations of a format such as a page-limited proposal, sometimes because a publication is simply too long to be useful or cost-effective. The usual editorial strategy is to root out verbal redundancy, delete unnecessary information, and compress ideas. Another strategy, sometimes overlooked, is to "reduce by design"--that is, to eliminate design elements that may be redundant, unnecessary, wasteful, or even extravagant. By altering the design of a publication, it is possible to reduce length without reducing effectiveness. A number of graphic elements can be manipulated to abridge the length of printed documents. They include (1) trim size; (2) type page size; (3) column arrangement; (4) type size; (5) white space; and (6) scaling of illustrations.

TRIM SIZE

Trim size is the size of the paper on which the publication is printed. The dimensions of the whole page are an important consideration in any attempt to reduce overall length. A larger trim size allows for more words per page, yielding a thinner publication. Typesetting costs may remain the same, but expenditure for paper can be significantly reduced, and mailing costs, which are calculated chiefly on the basis of weight, will be lower.

TYPE PAGE SIZE

The type page, sometimes called the text page or the text area, is the part of the page that is occupied by type. It includes text, headings, footnotes, and page number. Size of the type page is ultimately determined by trim size, of course--there is no way to have 10" of text on an 8" page. It is also delimited by margins. The size of a type page can be manipulated by adjustment of margins, and the savings in overall length can be considerable.

For a rather dramatic example of what manipulation of trim size and type page size can mean, consider the case of the campus catalog at a western state university. The catalog was 480 pages long, a full 200 pages longer than the catalog of other universities in the state system, including branches with twice as many students. There was, as often happens, verbal redundancy, unnecessary information, and much else that could be written out, but a considerable proportion of the excessive length had to be designed out.

The overall dimensions of the catalog were 7 3/4" by 9 1/4", and the vertical type page dimension was 7 3/4". Substituting an 8 1/2" by 11" trim size--an attractive and not unconventional size for a college catalog--and a vertical type page dimension of 9 1/2"--also attractive and not unconventional--made it possible to reduce the document by 86 pages, a full 18%.

Savings are not always so dramatic, and there may be external considerations such as a requisite mailing envelope that make it impossible to vary trim size. The potential for savings is significant enough, though, that it is very much worth considering modification of overall document size and of factors such as margins in any project that has overall reduction of length as one of its goals.

COLUMN ARRANGEMENT

Technical material is more economically set in two or three or even four columns than in a single column. A multi-column format will accommodate considerably more words per page, reducing the number of pages required. Ultimately the number of columns that are possible, and the width of the columns, depends on the trim size of the page and the need for ease of reading. I am not recommending the transformation of technical documents into Dickensian wills. It is important to remember, though, that a move to two columns from one, or to three columns from two, can yield real savings.

A bonus comes with the use of two or more columns. The text block is broken up into shorter lines, permitting the use of smaller type and less leading than is ordinarily possible in a typical one column line. Readability is not impaired, and the amount of paper required is further reduced.

TYPE SIZE

It may be possible to reduce the size of type, particularly of display type, and thereby save some space. The first consideration in deciding on size of type must always be legibility, so savings in this area may be minimal; no editor wants a document that can only be read with a magnifying glass. Nevertheless, many publications are set in larger type size than is really necessary, and headings, in particular, can often be set smaller, with no loss of legibility. The style of heading called a "side head," for example, is normally set in a much smaller type size than a conventional heading (see Figure 1). The side head is set in bold or italic type to make it stand out, and it is run in with the paragraph with which it belongs. Side heads produce two kinds of savings:

(1) the words of the head do not have to be set in a larger typeface than the body copy, and (2) side heads do not require the conventional double or triple spacing that precedes and follows larger, set-off headings.

WHITE SPACE

A considerable proportion of any page of text is white space--space between letters, space between words, space between lines of type (called leading), space between paragraphs, space before and after headings, space between sections and subsections. White space can be manipulated in the attempt to shorten printed documents. Leading, or line spacing, is often overly generous; space between paragraphs, and particularly between sections and subsections, may be excessive.

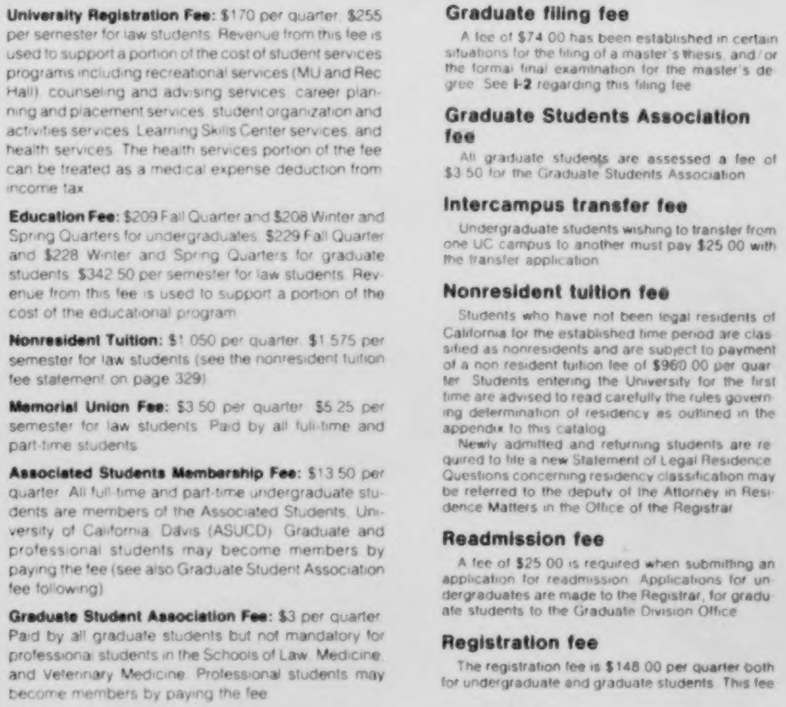
In the university catalog mentioned above, ten points of leading had been left between each course description. A move down to five points of leading barely affected readability and produced a savings of three and one-half column inches on each page (see Figure 2). Another ten points of leading had been left between paragraphs in the narrative section, and the names of faculty were set with excessive white space between entries. Adjustment of white space led to a savings of 31 pages, 6 1/2% of overall length.

SCALING OF ILLUSTRATION

Illustrations--maps, charts, graphs, tables, photographs, and the like--can be proportioned or scaled to different dimensions. Such reduction is not always successful: there is, for example, no way to reduce one dimension only, and an overly wide chart, reduced, may end up a better width but an inappropriate height. Thus there are no generalized rules for reducing illustration size. Each case probably has to be decided on its own merits, with the use of a proportion wheel or a pocket calculator. The point, though, is that many documents that need to be shorter do contain overly large illustrations, and that attention to this area may produce real savings.

CONCLUSION

A number of design elements in any publication are susceptible to variation and modification. Redesign is not a substitute for editing, but it is a useful adjunct technique, particularly valuable in any situation in which lower production cost is a goal. Many documents were designed when paper was cheaper, before typesetting costs had reached $65 an hour, when printing and binding charges were lower, and when U.S. postage was still within the reach of the average company. Production costs are now astronomical, and



University Registration Fee: $170 per quarter $255 per semester for law students Revenue from this fee is used to support a portion of the cost of student services programs including recreational services (MU and Rec Hall) counseling and advising services career planning and placement services student organization and activities services Learning Skills Center services and health services The health services portion of the fee can be treated as a medical expense deduction from income tax

Education Fee: $209 Fall Quarter and $208 Winter and Spring Quarters for undergraduates $229 Fall Quarter and $228 Winter and Spring Quarters for graduate students $342 50 per semester for law students Revenue from this fee is used to support a portion of the cost of the educational program

Nonresident Tuition: $1 050 per quarter $1 575 per semester for law students (see the nonresident tuition fee statement on page 329)

Memorial Union Fee: $3 50 per quarter $5 25 per semester for law students Paid by all full-time and part-time students

Associated Students Membership Fee: $13 50 per quarter All full-time and part-time undergraduate students are members of the Associated Students University of California Davis (ASUCD) Graduate and professional students may become members by paying the fee (see also Graduate Student Association fee following)

Graduate Student Association Fee: $3 per quarter Paid by all graduate students but not mandatory for professional students in the Schools of Law Medicine and Veterinary Medicine Professional students may become members by paying the fee

Graduate filing fee

A fee of $74 00 has been established in certain situations for the filing of a master's thesis and/or the formal final examination for the master's degree See **I-2** regarding this filing fee

Graduate Students Association fee

All graduate students are assessed a fee of $3 50 for the Graduate Students Association

Intercampus transfer fee

Undergraduate students wishing to transfer from one UC campus to another must pay $25 00 with the transfer application

Nonresident tuition fee

Students who have not been legal residents of California for the established time period are classified as nonresidents and are subject to payment of a non resident tuition fee of $960 00 per quarter Students entering the University for the first time are advised to read carefully the rules governing determination of residency as outlined in the appendix to this catalog

Newly admitted and returning students are required to file a new Statement of Legal Residence Questions concerning residency classification may be referred to the deputy of the Attorney in Residence Matters in the Office of the Registrar

Readmission fee

A fee of $25 00 is required when submitting an application for readmission Applications for undergraduates are made to the Registrar, for graduate students to the Graduate Division Office

Registration fee

The registration fee is $148 00 per quarter both for undergraduate and graduate students This fee

FIGURE 1. SIDE HEADINGS, AS IN EXAMPLE ON LEFT, ARE MORE ECONOMICAL THAN HEADINGS SET WITH SPACE ABOVE AND BELOW, AS IN EXAMPLE ON RIGHT

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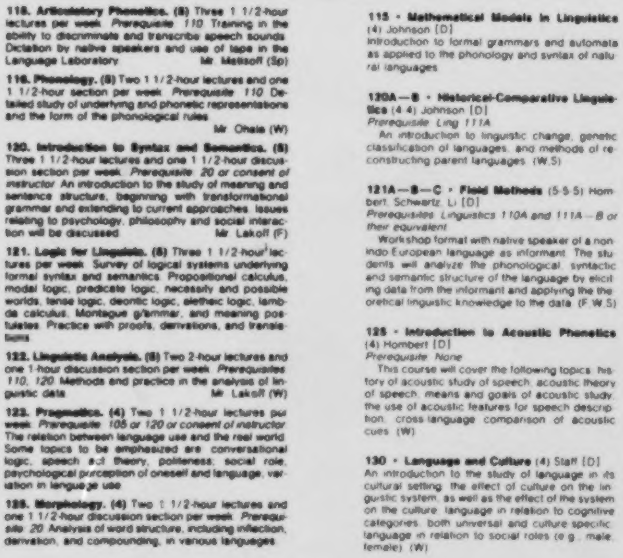
reducing by design can lead to impressive savings.

Not incidentally, it often happens that the effectiveness of an existing publication is improved when it is redesigned. A 300 page catalog may seem less forbidding than a 500 page catalog, may put off fewer readers, may be more widely used. A three column page with shorter lines may make it easier for a reader to follow complex technical information. A larger trim size may accommodate an illustration and the explanation of an illustration on the same page, with more ease than a smaller size. Reduction of white space between parts of a list or series may give the reader a clearer sense of connection between parts.

Editors are often asked to reduce documents by writing away pages. They sometimes find themselves in situations in which it seems impossible to cut words without sacrificing clarity. If design matters are considered in conjunction with editing, it may be possible to reduce length without reducing clarity, and to produce documents that are shorter and sometimes even more readable.



115. Articulatory Phonetics. (5) Three 1 1/2-hour lectures per week. *Prerequisite: 110.* Training in the ability to discriminate and transcribe speech sounds. Dictation by native speakers and use of tape in the Language Laboratory. Mr. Matisoff (Sp)

116. Phonology. (5) Two 1 1/2-hour lectures and one 1 1/2-hour section per week. *Prerequisite: 110.* Detailed study of underlying and phonetic representations and the form of the phonological rules. Mr. Ohala (W)

120. Introduction to Syntax and Semantics. (5) Three 1 1/2-hour lectures and one 1 1/2-hour discussion section per week. *Prerequisite: 20 or consent of instructor.* An introduction to the study of meaning and sentence structure, beginning with transformational grammar and extending to current approaches. Issues relating to psychology, philosophy and social interaction will be discussed. Mr. Lakoff (F)

121. Logic for Linguists. (5) Three 1 1/2-hour lectures per week. Survey of logical systems underlying formal syntax and semantics. Propositional calculus, modal logic, predicate logic, necessity and possible worlds, tense logic, deontic logic, alethic logic, lambda calculus, Montague grammar, and meaning postulates. Practice with proofs, derivations, and translations.

122. Linguistic Analysis. (5) Two 2-hour lectures and one 1-hour discussion section per week. *Prerequisites: 110, 120.* Methods and practice in the analysis of linguistic data. Mr. Lakoff (W)

123. Pragmatics. (4) Two 1 1/2-hour lectures per week. *Prerequisite: 105 or 120 or consent of instructor.* The relation between language use and the real world. Some topics to be emphasized are: conversational logic, speech act theory, politeness; social role, psychological perception of oneself and language, variation in language use.

125. Morphology. (4) Two 1 1/2-hour lectures and one 1 1/2-hour discussion section per week. *Prerequisite: 20.* Analysis of word structure, including inflection, derivation, and compounding, in various languages.

115 · Mathematical Models in Linguistics (4) Johnson [D]
Introduction to formal grammars and automata as applied to the phonology and syntax of natural languages.

120A—B · Historical-Comparative Linguistics (4 4) Johnson [D]
Prerequisite: Ling 111A
An introduction to linguistic change, genetic classification of languages, and methods of reconstructing parent languages. (W,S)

121A—B—C · Field Methods (5 5 5) Hombert, Schwartz, Li [D]
Prerequisites: Linguistics 110A and 111A—B or their equivalent
Workshop format with native speaker of a non-Indo-European language as informant. The students will analyze the phonological, syntactic and semantic structure of the language by eliciting data from the informant and applying the theoretical linguistic knowledge to the data. (F,W,S)

125 · Introduction to Acoustic Phonetics (4) Hombert [D]
Prerequisite: None
This course will cover the following topics: history of acoustic study of speech, acoustic theory of speech, means and goals of acoustic study, the use of acoustic features for speech description, cross-language comparison of acoustic cues. (W)

130 · Language and Culture (4) Staff [D]
An introduction to the study of language in its cultural setting: the effect of culture on the linguistic system, as well as the effect of the system on the culture; language in relation to cognitive categories, both universal and culture specific; language in relation to social roles (e.g., male, female). (W)

FIGURE 2. HALF AS MUCH LEADING BETWEEN ENTRIES IN EXAMPLE ON THE LEFT AS IN EXAMPLE ON THE RIGHT, WITH NO LOSS OF LEGIBILITY

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ED239277

MANAGING THE EDITING FUNCTION ON LARGE PUBLICATION TASKS WITH SHORT FLOW TIMES

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ABSTRACT

Large publication tasks with short flow times require that several editors be assigned to work as a team and as part of a larger publication team that includes management, engineer-writers, publishing logistics personnel, word processor operators, illustrators, and printers.

Team-edited publications have special problems and benefit from application of formalized procedures. The keys to success include—
a. Established editing standards.
b. Complete and realistic schedules.
c. Concise and complete written instructions.
d. Manageable work packages.
e. Continuous job-status visibility.
f. Good quality-assurance disciplines.
g. Esprit de corps.

The job can get done without formalized procedures, but the process will be more traumatic and more expensive, and the published documents are more likely to be disorganized, incomplete, and inconsistent.

INTRODUCTION

Most of the editing tasks I've worked on or managed over the last 16 years have been large, multivolume projects with very short flow times. Therefore, as a matter of survival, I have helped develop processes and tools that bring discipline and order to the editing task. This paper describes these processes and tools.

First, the task is defined, the team assigned to accomplish it is described, and some typical problems facing the editors are listed. Then the methods we use to solve those problems are discussed.

THE TASK

For the purpose of discussion, this publication task has the following features:

a. Twelve volumes, totaling 2,000 pages.
b. About 80 writers, all of whom are engineers or engineering managers with little or no writing or publishing experience and each responsible for writing only a few pages of the total. One engineering manager is assigned as volume manager for each of the twelve documents.
c. Nine editors, of which one is a full-time lead with no time to edit. The lead is assigned to the project at the same time as the writers; the other eight editors do not start until the writers have finished the final draft.
d. A dedicated, three-shift-per-day word processing group.
e. A team of five publishing logistics specialists to coordinate all artwork preparation, movement of data packages between buildings, and draft reviews, and to arrange for bookbuilding, printing, and delivery of the documents.
f. Three weeks allotted from first edit to final proof of the camera-ready flats.

TYPICAL PROBLEMS

The problems facing the editors on a task this size are far too numerous to mention all of them here, but I am listing those with greatest impact on quality and schedules and whose solutions are mandatory to successful task completion.

1. The text is poorly written, but there is no time for rewrite or reorganization—only for a surface, "housekeeping" edit for grammar, sentence structure, tense, punctuation, capitalization, and consistent abbreviations and terminology.

2. The schedule allots so little time to the editing function that even the "housekeeping" chore cannot be done well.

3. Some of the engineer-writers are very vocal with their concerns that "the editors will change the meaning," and defensive and disagreeable when asked to clarify a paragraph of technical gibberish.

4. No one editor ever sees the whole set of documents or even one entire document. Nine editors could be applying nine different styles to a single set of documents.

5. The short schedule necessitates that all 2,000 pages be processed almost concurrently. There will be some sections in editing, others in word processing, others already into bookbuilding, and still others in final camera-ready reviews or in printing. The problem is to know where all the pieces are at any given time and how to access them for last-minute changes with minimal impact on the production flow.

THE SOLUTIONS

The suggestions I offer here don't solve problems like poor writing and last-minute changes—but they do keep the editing task under control and ensure timely completion of technical documents that have at least the *appearance* of being well written. And that is better than a poorly written document that is also late and has misspelled words, several different formats, and missing data.

The solutions are in seven categories:
a. Established, detailed editing style standards.
b. Complete and realistic schedules.
c. Concise and complete written instructions to all team members.
d. Breaking the task into smaller, manageable packages.
e. Continuous job-status visibility.
f. Good quality-assurance disciplines.
g. Esprit de corps.

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Established Editing Style Standards

Every editor or group of editors must have an established, written guide to editing style. This is particularly important when more than one editor is working on a single document. The reader should not have to see nine different approaches to capitalization, abbreviations, and spelling.

A documented standard also helps provide editor credibility during editor-author discussions of why "which" was changed to "that" and "psi" became "lb/in^2."

Complete and Realistic Schedules

Master Schedules. The most important thing I can say about master schedules is that they must be approved by every part of the publication team before the task is begun. For instance, a master schedule prepared by the engineering writers probably will show either too little or too much time for the functions with which they are unfamiliar (e.g., editing, printing). A schedule prepared by the publishing logistics staff may not account for the time needed to collect subcontractor data (writer task) or to edit and proofread the last volume (editor task).

The best way to establish the master schedule is for representatives from all the functions to meet and hammer it out. Then everybody can be satisfied that although there is still not enough time to do the job properly, as much time as possible has been allotted to each task considering the realities of all the other tasks. The editing supervisor or lead editor must have an equal vote when the master schedule is being prepared.

Editing Schedules. Once you know how many days (master schedule) you have to edit and proofread 2,000 pages, the editing schedule can be developed. This schedule considers—

a. The number of pages to be received each day for editing.
b. The number of pages to be returned from word processing (WP) each day for proofreading.
c. The realities of at least three trips through WP before error-free copy is attained.
d. The requirement for author review of text galleys before submittal to bookbuilding.
e. The time it takes to finalize all the front matter—tables of contents, lists of figures, lists of abbreviations, etc.
f. Number of final galley pages owed to logistics staff each day for final bookbuilding.

To develop this schedule you have to know how many pages per hour you can expect—

a. An editor to edit.
b. An editor to proofread.
c. The WP center to process in both input and correction modes.

The right number of editor-hours per day can then be scheduled, and you can let the staff know the bad news about overtime.

Concise and Complete Written Instructions

Instructions to the Writers. In our system, the writers receive writing assignments, page allocations, thematic instructions, and schedules from the engineering volume manager. These instructions should be in written form as well as verbal.

The lead editor, who starts working on the project at the same time as the writers, helps determine the appropriate format, identifies inconsistent terminology, helps make decisions on preferred terminology, and issues written instructions to the writers that, if followed, will improve the writing and make the editing job easier. These instructions should include—

a. The format for the draft.
b. Instructions on how to get drafts typed, including tips on successful use of a word processing center.
c. How to number and title figures and tables.
d. A short (one or two pages), *layman's* version of how to improve writing style.
e. A first cut at the list of abbreviations and acronyms.
f. The list of preferred terminology for this publication (e.g., acceptable ways to write organization titles or refer to other volumes, and the official names of hardware, software, and facilities).
g. The name, location, and phone number of the lead editor, with an invitation to call for help or guidance during the draft preparation period.

Instructions to the Editors. Before the editors report to the project, the lead editor must prepare a packet of written instructions for them. This packet should include—

a. Format instructions (draft and final).
b. Exceptions to established editing standards for this publication.
c. Special instructions for marking text during proof cycles (e.g., figure references, questions for author).
d. List of preferred terminology for this publication task.
e. A first cut at a list of abbreviations and acronyms.
f. A document tree and a set of document outlines that scope the whole task.
g. Any other pertinent data helpful to an editor, such as a synopsis of the project being documented and the intended audience and purpose of the documents.

Allow at least a half day for each editor to assimilate all these data before expecting edited copy to be produced.

Breaking Up the Large Task

There are 2,000 pages to be edited. The only way to manage 2,000 pages in 3 weeks is to separate them into packages of about 20 pages each.

The benefits of breaking the whole into small packages include—

a. Many people can work on a single document at once.
b. No "problem" section can hold up the rest of the document.
c. The packages can be put in folders whose covers can be used to record the status of that package (who did what and when to the pages inside; e.g., edit, proof, check for figure references, pull out data for table of contents, etc.). (See figure 1.)

The steps involved in breaking each document into small packages are as follows:

a. Get 100 manila folders.
b. Separate text into about 20-page packages, each package starting with a section or subsection number (do not start a package with an unnumbered paragraph), and put in folders.
c. Label the front of each folder with the volume number and/or title and the subsection numbers with which the text inside starts and ends.
d. Stack up the folders for each volume in order, so you have a complete document. Then label the folders A, B, C, D, etc. (see figure 1). Labeling the folders alphabetically allows you to use the tracking chart described in the next section and to easily reassemble the document later.
e. Use the front of the folders also to record the status of the text inside; e.g., date and time edited, date proofed, author-reviewer initials and date). (See figure 1.)

Continuous Job-Status Visibility

Now the editing task has started in earnest. You are the lead editor. There are 100 manila folders floating around the building in various stages of completion—editing, typing, proofing, author reviews. Then—

a. At least three levels of management ask every 2 hours, "Are we on schedule?" or "What's the status of volume III?" or "How much overtime are the editors planning to work tonight?" Considering your career growth plans, your answers to management should not be "Probably," "I don't know," and "Quite a lot."

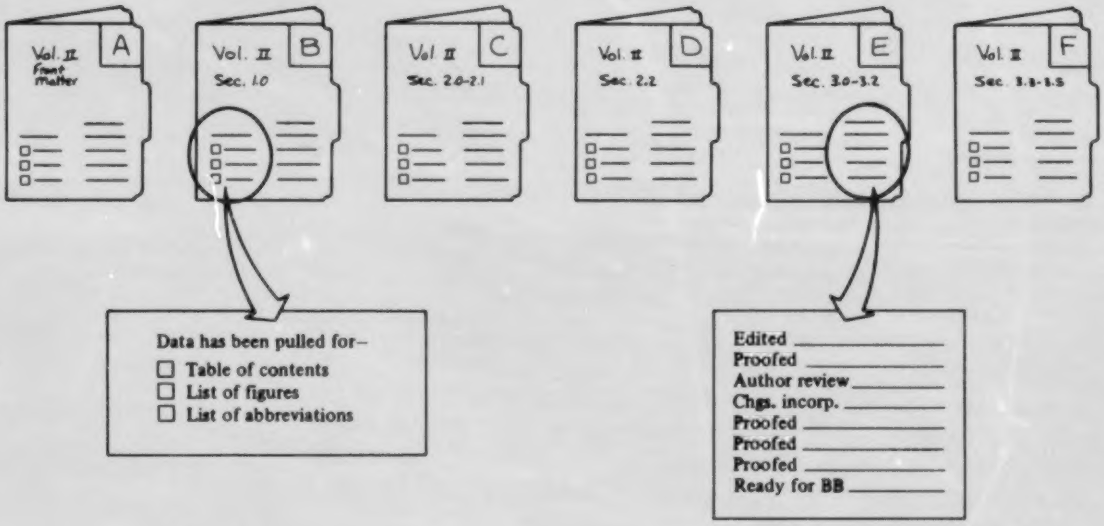
Vol. II Front Matter A
Vol. II Sec. 1.0 B
Vol. II Sec. 2.0-2.1 C
Vol. II Sec. 2.2 D
Vol. II Sec. 3.0-3.2 E
Vol. II Sec. 3.3-3.5 F
Data has been pulled for–
☐ Table of contents
☐ List of figures
☐ List of abbreviations
Edited
Proofed
Author review
Chgs. incorp.
Proofed
Proofed
Proofed
Ready for BB

Figure 1. Marking Text Folders

b. The logistics staff wants to know how many text galleys will be ready for bookbuilding at 4:00 p.m., and which sections they are. If you have to guess at how many pages will be ready for bookbuilding at 4:00, and you guess wrong, the publishing logistics manager will use your name when explaining to his management why he has 15 bookbuilders sitting on overtime with nothing to do.

c. The word processing center wants to know how many operators to schedule on second and third shifts: "How many pages will you be sending in, and are they new input or corrections?" If you have to guess on word processing requirements, and if you guess wrong, and only two operators are scheduled and it turns out that you needed six, the next morning the editors will have nothing to do because everything is stacked up in the word processing center.

d. The engineering manager says, "I want to make a change to section 2.3.1 of volume II. Where is the folder?" If you really want some fun, tell the engineering manager that you can't find his section anywhere, but you think you're working on it.

The tool you can use to provide the answers to these questions is a matrix-type tracking chart.

You need one chart for each volume. Label the top of the chart with the volume number. Down the left side of the chart put the letters A, B, C, D, etc. (Remember the folder labels?) Label the column headings with each step of the publication process from the time the editing staff receives the document until it is ready for the printer (see figure 2). Now you have a device for tracking 100 manila folders.

These charts are most useful if they are large (at least 11 inches by 17 inches) and wall-mounted—because then they are visible to everyone who wants to know status, which is almost everyone on the project. Putting these charts on the wall has at least two benefits:

a. Time saved for the lead editor because he or she does not have to stop and explain job status to the program manager, the editing supervisor, the engineer, the typists, the art coordinators, or anybody else. It's on the wall in plain view for everybody.

b. Encouragement to the writers to meet deadlines for submittals and reviews. If the charts reflect missed schedules via a red dot in the appropriate column, the various levels of management are immediately aware of problem areas—and generally take appropriate steps to solve them.

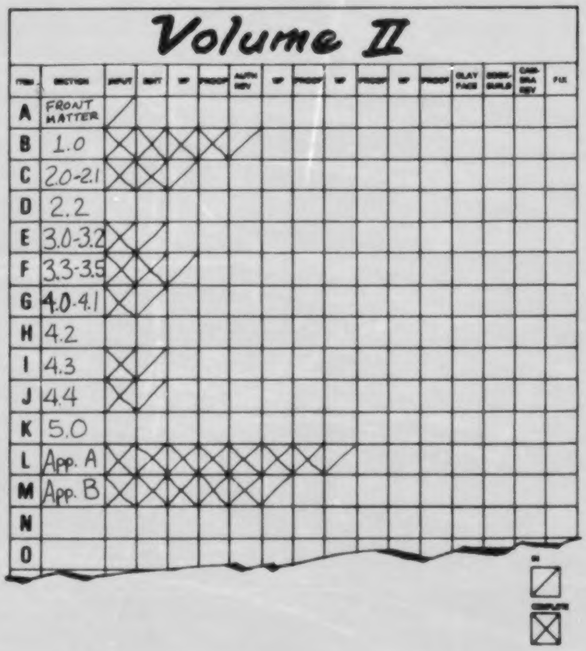
Volume II
A FRONT MATTER
B 1.0
C 2.0-2.1
D 2.2
E 3.0-3.2
F 3.3-3.5
G 4.0-4.1
H 4.2
I 4.3
J 4.4
K 5.0
L App. A
M App. B
N
O

Figure 2. Tracking Chart

Job-status visibility is also maintained by the simple tool of talking to the other function managers. An editing manager who does not talk frequently to the publishing logistics, engineering, and word processing managers is working in a vacuum, and can be surprised with a schedule change, an additional document to be prepared, or the fact that three second-shift WP operators are ill and will not be in on the night when the largest number of pages will be processed. Conversation, several times a day, may give forewarnings of these potential problems, thus enabling them to be solved or planned for.

Good Quality-Assurance Disciplines

No matter how well the lead editor has scheduled and tracked 2,000 pages, it is not good enough unless all quality-assurance (QA) disciplines also have been applied. Scheduling and tracking ensure timely completion, which is one of our goals, but it takes good QA disciplines to ensure "the appearance of being well written," another of our goals. The most basic QA tools are—

a. Application of established editing standards.
b. Proofreading after every correction cycle, no matter how minor.
c. Allowing the writer to review his section after the initial edit-proof cycle to ensure that the editor has not inadvertently changed the technical meaning of the text.
d. Editor checks of the camera-ready flats prior to printing—and proofreading to ensure the corrections were made.

The longest running battle our editing staff has with the publishing logistics and art production staffs is whether the editor gets to check the camera-ready flats after the last correction is made and before they go to printing. The answer is yes!

Esprit de Corps

All the processes and tools discussed work better if those using them work and think as a team rather than as individuals. And, of course, the editing task goes smoother if the editors not only feel that they are a team, but also that the editors are a part of the larger publication team of writers, managers, publishing logistics personnel, word processor operators, and illustrators. When the team attitude does not exist, and the long hours cause fatigue and short tempers, the work environment can degenerate into an "us versus them" situation.

How can the editing manager create and maintain esprit de corps among the troops? I don't know what all the factors are that create it, but we almost always attain that happy state. A few things that I know do help are the following:

a. Let every individual on the team know the whole picture—why the schedule is so compressed, who will be reading the documents and why.
b. Encourage conversation between the editor and the writer, reminding the editor that he or she is there to help the writer not to criticize him.
c. Let the writers know that the editors want to help, and you will be glad to answer questions or offer guidance on good written communication during the draft cycles, even before the editing task begins.
d. During periods of low workload between large publication tasks, hold some meetings attended by editors, logistics people, the art production staff, and word processing people to discuss problems on the last job and possible solutions. Understanding the other guy's problems is the first step toward cooperation.

SUMMARY

We at Boeing Aerospace Company use the tools and processes described here to publish new-business proposal documents, contract reports, and many other documents. Although they were developed to help on large, high-pressure, team-edited tasks, the concepts also work well on a single-editor publication task if it requires the document to be split into sections for processing through editing, typing, reviews, and bookbuilding.

We like the system we've developed, and we've never missed a deadline.

GRANT WRITING TIPS

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GRANT WRITING TIPS by Margaret P. Goddin presents suggestions to the grant writer based upon six years of successful grant writing and implementation experience of the author. She discusses suggestions for writing grant proposals for both public and private agencies.

During the last decade, educational institutions and funding agencies courted one another successfully for grant funds, resulting in many satisfied institutions and agencies. With recent economic constrictions and cuts in federal support for almost all areas, higher education institutions have experienced greater difficulty in obtaining grant funds for worthwhile projects.

However, funds are available, and agencies still seek worthwhile projects to fund. Except for a very few institutions, colleges and universities today realize that outside funding to support higher education is even more important now than it was in the recent past. Every institution feels that it needs money. Every institution feels it should be funded. However, merely to need funds will not acquire outside money for the institution. Funds are awarded for ideas; funds are awarded for projects which attract the interest and support of organizations and individuals.

To write grant proposals for funding and implement grants provide both a challenge and a good deal of hard work. The following tips for grant writing and implementation result from my experiences.

Before obtaining a grant application form, survey your ideas. Faculty at your institution always have ideas for which they need funds. Even if your institution employs a professional grant writer, that individual can write only about ideas developed primarily by the faculty. And the faculty implements the grant. Assemble a group of faculty and administrators to brainstorm about how you can achieve your educational goals through additional funds. Consider the ideal situation. If the institution could have the amount of money needed, list projects it would use to help achieve particular goals. During the brainstorming session, no one would question the feasibility of or motivation for anyone else's suggested project. All brainstorming group participants should know that ideas will be refined based upon established priorities and on what projects agencies are likely to fund. After the initial brainstorming, assemble a small group to discuss and agree upon the projects which have greatest potential for helping the institution achieve its goals and solve some of its problems.

Some of the suggested projects are probably fundable. You can begin to search for agencies which will support your particular ideas.

Review the current CATALOG OF DOMESTIC ASSISTANCE published by the Office of Management and Budget, U.S. Government Printing Office. This 900 page document indexes government funding, providing a profile of basic information about the major type of projects funded, date of application, date of grant award announcement, etc. If your specific project idea is not listed among possible projects, you may be able to adapt your project so that it can be funded. If you feel there is a good possibility you could be funded, write the agency and follow up with a phone call.

For information about foundation funding, consult THE FOUNDATION DIRECTOR, Marianna O. Lewis, Editor, published by The Foundation Center. Another available source is THE TAFT FOUNDATION REPORTER, Yvette Henry, Editor, published by The Taft Foundation Information System. Review reports of projects funded by large foundations. If your proposal is related to something already funded by that agency, they may be interested in your ideas. However, the opposite may also be true. The agency may be searching for new ideas and different type projects.

Contact the agency's program officer for your area and outline your ideas and possible projects. Obtain an appointment to talk with the program officer. In a face-to-face discussion, you can usually obtain signals of interest in particular projects. You will also know which projects are not of interest to the agency. In the case where the parent federal agency is in a state of flux, any information you obtain personally will be more up to date than that obtained through more formal processes. After you agree that you might qualify for government funds, ask to see grant applications of previously successful applicants. Although these grant proposals are public information, it is difficult to read them elsewhere than in Washington in the agency's office. Ask to see those projects they consider to be best and those from institutions similar to your own. Your allotted time to scan these materials generally will be relatively short, thus you may want to have another person from the institution assist in looking over areas of potential difficulty in writing a grant proposal.

Program officers generally want to help you develop a successful application. The agency wants to fund good projects which then help justify the agency's need for additional funds the following year. One of the goals of education lobbying groups is to obtain more money for improvement of education. If educational institutions can demonstrate through their projects that they are worthy of funds, the students, the funding agency, and the educational institution benefit.

In contrast with federal and state governmental agencies, the procedure for obtaining grant funds from private foundations is not as clearly delineated. One of the best ways to ascertain the kind of projects funded by a private agency is to read selected publications. In addition to the formal listings previously indicated, periodic newsletters such as that of the American Council on Education, regional newspapers, and educational journals publish notations about institutions awarded grants for particular projects by private agencies. Corporations such as Ford, Kellogg, and Exxon publish reports on projects they fund. Agencies want to fund worthwhile projects.

Contact with the private agency may be more difficult than with the government agency. Private foundations generally do not publish detailed grant application guidelines. Learn as much as you can about the foundation prior to initiating contact with them. We learned that in the case of one foundation the program officer was particularly interested in funding private educational institutions. In the case of another foundation, we knew they were interested in funding educational institutions in our state. We recognized from a study of another foundation's funded projects during the preceding five years that they had funded institutions in several Appalachian region states but none in West Virginia. Since West Virginia is the only state lying entirely within the Appalachian region, we appealed to their goal of funding Appalachian area projects and their interest in our particular project.

With other foundations, we talked about their demonstrated interest in their own continuing major projects. For example, we researched foundations that regularly fund nursing programs. We approached ones we felt would be interested in our particular type program designed to educate nurses for service in our area where there is a critical shortage. Contrary to the national trend in federal agencies which are cutting funds for nursing programs, we have been able to obtain private foundation support for our nursing program.

After you receive encouragement from federal, state, or private funding agencies with whom you have talked, the next step is to draft the grant proposal. In the case of federal agencies, follow their specific guidelines. Do not become frustrated when you are asked to state the same information in several sections of the proposals. By so doing you clarify for yourself and the agency your goals, your procedures, and your outcome.

Since the private foundation probably will not provide as many detailed guidelines, you will need to determine the type of presentation a particular organization prefers. Several foundations require only a brief outline of the project to be followed by a more complete proposal if evaluators determine that the project should be funded. Others require in a first proposal the historical background of the institution to establish its ability to implement the project, a listing of goals of the project, and a delineation of procedural steps to achieve the goals. Both the public and private agency will want evidence of your commitment to achieve the project through listing of specific personnel to be involved, a schedule of implementation steps for each stage of the project, and the projected cost. For federal agencies, these costs must be based upon quoted prices. If the project will not be funded for another year, add to current price quotations the agency's guideline on inflationary rate increases. All possible costs should be incorporated, including pro-rated salaries, supplies, telephone, postage, etc. If you provide matching funds, these, too, are detailed. In the case of private foundations, the amount of detail required varies. Any information or exhibits you can include to demonstrate the worth of your institution and your project will add to the reader's understanding of whether or not your institution can be relied upon to implement and complete the project.

Grant applications must be submitted by the stated deadline. If major applications cannot be hand-carried, be sure to submit them well in advance of the deadline and request a return receipt. For large federal agencies particularly, greater safeguards will assure consideration of your application.

Then wait for a reply. If the agency asks for further information, you know that they are reading your application with interest. Federal agencies have a board of evaluators who read applications and rank them according to established guidelines similar to the ones in the application. For government agencies the date to announce grant awards is published in the application guidelines. Private foundations notify you after regular meetings of evaluators or boards. Even if you have been notified by telephone that the grant has been awarded, you cannot begin implementation of the project until you receive the official letter of notification.

When you implement the grant you will probably discover procedures which need to be changed, particularly if an academic year has elapsed between the submission of the grant application and the date the grant is awarded and implemented. The granting agency usually provides for this by specifying parameters for the range of change they permit without prior approval.

Reporting progress on and completion of the project are an important part of grant implementation and responsible use of the awarding agency's funds. For government agencies, the report includes a narrative of activities and the completion of specific accounting forms on specified dates. Successful reporting and accountability for one project may lead to successful funding for a second project.

Although grant writing is a time consuming and sometimes frustrating process, grant implementation rewards your efforts. I am told that if you are awarded one grant from among ten applications submitted, you are fortunate. I think you can improve on that ratio by carefully screening the agencies to which you apply, being enthused about your ideas and selling these to agencies, working closely with agency program officers, achieving successful implementation of the grant, and providing appropriate accountability.

THE TROUBLE WITH DEFINITIONS

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Abstract

Words are defined not by the dictionary, but by their context. They float. They change. They move. The labels and the definitions we assign are fleeting and temporary. Language is not static, but dynamic.

Context is often established by comparison, or contrast. It can also be established by an adjective or an example. In short, words are defined by the sentences in which they appear.

Where does all of this leave us, in limbo? Not at all. Instead, it anchors us to the real world, instead of to delusions about single word meanings that are "real," "true," or "pure."

Years ago, I had a friend who lived in a subdivision in St. Louis County called "Indian Meadows." Old time St. Louisans know Indian Meadows well, because it was formerly the Indian Meadows Golf Course. Indian Meadows had a long and pleasant history.

One day a neighbor child came up to my friend and asked, "Are there any Indians around here?"

"No."

There was a pause.

"Are there any meadows?"

"No."

Absolute silence.

Today, many years later, I am a Technical Writer.

People often come to me and ask,

"Is your work technical?"

"No."

"Do you do a lot of writing?"

"No."

After a long pause, most people smile bravely, look at their shoes, and change the subject. They seldom ask the obvious question: "Why on earth do you call yourself a technical writer?"

I know a lot of other technical writers. Some of them are old, some are young, some men, some women, some black, some white, some experienced, some new. Some are proofreaders, some are primarily "gophers," and some are "bushwhacker" editors, like me. Some have technical degrees, but most do not. Some are competent writers, and others don't even try to be.

Definitions, Broad and Narrow

I actually have a more suitable answer for those friendly questioners. When they ask me if I do a lot of writing, I don't say "no," I say "yes." I define writing in its broadest sense, to include editing and revising and copyreading. And when they ask me if my work is technical, I also say "yes," because the writing is on technical subjects, again "technical" being defined in its broadest sense: management proposals, brochures, and manuals as well as "pure" technical material.

But "technical" has another meaning, very much more narrow. Just the other day I read a so-called "technical paper" and called it "not very technical." What did I mean by that? I meant that it had no advanced math, no difficult concepts, no unusual theory. It was a technical paper that was not technical.

Think about that for a while. Does that make your head hurt?

Now and then, in technical writing, someone encounters a paradox like that for the first time. What does "technical" really mean? They begin to worry about it. Then they ask another question.

"How can you, as a technical writer, know what you are writing about if you do not have precise meanings for the terms you use?"

To me, the answer to that one is easy, easy. That may be because I'm soaked in semantics, the study of meaning.

Language is Dynamic

The answer is that words are defined by their contexts, not by the dictionary[1]. They float. They change. They move. The labels and the definitions we assign are fleeting and temporary. Language itself is not static, but dynamic.

You may find my position unsettling, but please read on.

Take the word "technical." That's a word that we all use in many different ways, depending on context, occasion, audience, intent, mood, and many other factors. It is basically an abstract term, and to try to define its limits may be a mistake. It is sometimes used in contrast to "management." Sometimes it is used in contrast to "liberal arts." It is sometimes used in contrast to our "English" editing. But, on the other hand, in Fowler's Modern English Usage the section called "Technical Terms" is devoted exclusively to the arcane technology of the English language[2].

The schools are now defining "Technical Writing" much more broadly than we do in industry and government. Should we blow the whistle on them? Of course not. To them, "technical" is in contrast to "expository" and "creative" and perhaps "journalism," and is a useful term for differentiation.

Thus, "technical" is a relative term, like "young."

Here is another startling comparison. "Technical" might be considered to be the opposite of "artistic," springing as it does from the opposite side of the brain. But the Greek root of "technical" is "techne," which means "art." They are one in the same.

Now, would you like to try to define the word "art?"

Where does all of this leave us? In limbo? Not at all. It simply anchors us to the real world, instead of to delusions about any isolated term having a single meaning that is "real" and "pure" and "true."

As I say, words are not defined by dictionaries as much as by the contexts in which they are used. Dictionaries, inadequate books that they are, give us only landmarks. And the best landmarks they give us are the examples. These are the data points on the multidimensional curve of actual usage. Country music doesn't come from just one country.

"Words Are Chameleons"

This is one thing that is fascinating about words. You remember that Justice Learned Hand said "Words are chameleons that reflect the color of their environment."

Take a word and put it next to other words, in a different context, and watch it change. Let's examine the word "look." It is connected with seeing, with eyesight. But we can "look up a new restaurant" or "look down on foreigners," or "look into a personnel problem," or "look for happiness," or "look out for lung cancer." Now define "look."

Try the same with "carry," "put," "push," "run," and "pick." They are all undefinable unless you know how they are being used. Startling.

Another characteristic of language is that we have to define words in terms of the audience rather than in terms of ourselves. I am a technical editor, of course. I sometimes yearn to call myself a "Super Editor" or "Exalted Lord High Editor." But I'm not sure at all that I could get the agreement of my audience for such embellishments. And we have to use words that our audience accepts. We cannot legislate meaning, except in a very limited way.

Even the enormous power of the Federal Government cannot legislate meaning. It can't even change our traditional understanding of "shall" and "will." Every technical writer knows that "shall" means "must." But every good technical writer knows that "shall" never means "must," except perhaps in government writing itself. (Shall I give an example?)

Five Principles of Definition

Back to definitions. I'd like to present five principles (among many).

First, some things simply do not need defining. I often tell students that the military has "redeployed" the word "shall." "Redeployed" is a metaphor. Metaphors generally break down under rigid definition. Nevertheless, I know that my audience knows what I mean, and will not mind that I have used the word "redeploy" in a sense that is slightly off the dictionary definition. In fact, when authors are off target far enough, please call it poetry.

Second principle. The sentence is the smallest unit of thought, not the word. The words shape the sentence, but the sentence is the kernel. This idea takes the pressure off of the individual words and allows them to flow gracefully into the context, if we let them.

Third principle. Definitions, when you do need them, should not tell what things are, but what things do. Thus, a typewriter types letters, and its size, shape, weight, and color are secondary.

(Stop. Do you see the ambiguity in the words "typing letters"? Letters for the post office or for the alphabet? Note that it makes absolutely no difference to the thought of the sentence. A typewriter types letters. Thus, we do not need to be literal minded and fuss about a "definition." See Principle No. 1, Some Things Do Not Need Defining. Do you accept this idea?)

Fourth principle. The word is not the thing. You can define a word only in terms of other words, which in turn have to be defined.

Fifth. Almost every word, except for proper names and technical terms, has at least two meanings. Think of "ring," "set," "paper," "type."

The Importance of Context

Context is therefore important. The word "style" gives us editors heartburn, as a word, but not in context. The "Jane Austen Style" cannot be found in a "style book," and we know that without any confusion at all.

Similarly, the word "copy" does not need to be defined, nor "composition." Instead, we, as good writers, will furnish the context automatically, with a one-word clarification (perhaps a simple adjective, like "more copy," or an example, "news copy.")

In one technical writing office, there used to be a sign warning editors to spell "overall" with a hyphen, to avoid confusion with "overalls." I find that extremely insensitive. The writer of that sign did not consider context.

I can see it now. If I were a bartender, and the man who wrote that sign came in and ordered a "draft," and then took the time to define for me that he wanted a glass of beer, and not a preliminary copy of a report, I'd cut him off. He wouldn't get either one.

Conversely, none of the "drafts" that I see at work are the least bit intoxicating. There is no chance of confusion.

Definition by Contrast

Perhaps the most powerful tool for the writer in establishing context is definition by contrast. Essentially, we can orient the reader and tell him what to expect by contrasting the object with something that it is not.

O.K. English is a nationality, and also a language used occasionally in technical reports. The word "English" is an inherently ambiguous term. But when we discuss "English vs. latin," there is never any confusion at all. We are obviously talking about the English language. We are linking the word with a word which offers context by pairing or contrast.

A lot of people are confused by the word "Portland." But we can immediately establish a clear identity by pairing her with Fred Allen. ("Oh, that Portland.")

Combine this idea now with Justice Hand's concept that "Words are chameleons." Watch how the word "rhetoric" changes when we simply contrast it with what it is not.

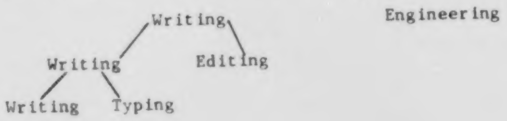
Rhetoric vs. logic	Bombast, not facts
Rhetoric vs. grammar	Writing effectiveness, not syntax
Rhetoric vs. artwork	Text, not pictures
Rhetoric vs. simplicity	Ornate writing, not straightforwardness

What does "rhetoric" really mean? In the proper context, it can mean any of the four, with no definition being needed.

So, perhaps, when that friendly acquaintance comes up and asks us about our job and if we do a lot of writing, the proper response is "Contrasted to what?"

Definition on Several Levels

"Writing" is one of those words which can exist on many different levels simultaneously. Writing can mean (1) handwriting, in contrast to typing, or (2) writing, in contrast to editing, or (3) writing as a profession, in contrast to engineering. Here's how we would diagram that in "tree" form:



Thus, "writing" can indeed be a subset of the word "writing" and even a sub-subset. (We run into this problem when we try to define the word "subsystem." Is an aircraft a "system" or a "subsystem" of a larger "weapons system," and is the environmental control system really a sub-subsystem? That problem can waste a lot of low-grade management time, if you let it, and raise a lot of bureaucratic blood pressures. Tip: What does the reader call it?)

In publications work, there are many words that are ambiguous, such as "style," "composition," "copy," and "format." But they are not the only ones. Add to the list "letters," "type," "printer," "figures," "manual," "right," and "left," and even "English." There are hundreds of words to fret about, and an indefinite number of nuances among them. "Proposal organization" can mean either people or sections of the book.

Defining "Editing" by Contrast

The word "editing" always causes a lot of controversy. But let's try something.

Editing vs. writing
Editing vs. proofreading
Editing vs. revising
Editing vs. critiquing
Editing vs. formatting
Editing vs. condensing
Editing vs. copyreading
Editing vs. blue-penciling

Each of these conjures up a different picture of an editor, ranging from one who does far more than "blue-penciling" to one who does far less than "revising."

So what if you want a single "definition" that tells you what the word really means? Well, it means different things, to different audiences, at different times, under different circumstances, and its scope continues to grow, like the expanding universe itself, to cover a wider and wider range of activities and capabilities.

I suggest that in these eight definitions-by-contrast, you have eight different tasks, not one, but that any one of them could pass as a definition of a particular type of "editing." The wide scope of editing can also be seen in the "levels of edit" concept conceived for cost purposes by Mary Fran Buehler and the people at Jet Propulsion Labs.

Thus, it can be seen that "editing," because of its very abstractness and elasticity, is a perfectly legitimate term for any of the definitions-by-contrast. And also for the writing and compiling and boilerplate-updating and rewriting and consultation and monitoring and drawing and cutting and pasting done by many of us as professional editors. All of us can be called "editors," although our jobs vary widely.

The Inadequacy of "Word-Bound" Definitions

But, I still hear you saying, "How can we know what we are talking and writing about if we do not have commonly understood meanings for the terms we use?"

Again, I say, it's easy. We inherently define exactly what we mean, by context and contrast, or by description or example, rather than by word-bound definitions. But more than that, we begin to realize that words are chameleons that reflect the color of their environment, and that their environment is most often the sentence where they are located. The sentence is the smallest unit of thought, not the word.

What do you mean by "technical writing"? It depends. The technical writing I do is different from yours. The objectives are different, the result is different. The routines are entirely different, and even the tools are different. But we all have a relationship nevertheless, an undefinable kinship, and if we can relax and forget our differences we can help each other learn and progress together in the quest for professional excellence in technical communication.

1. Hayakawa, S.I., Language in Thought and Action. Second Edition. HBW 1964. p. 54ff
2. Fowler, H.W., A Dictionary of Modern English Usage. Fourth Printing, Oxford University Press, 1950. p. 597ff.

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He is co-author of a textbook: "Technical Writing, Principles and Practices," published by SRA in 1982 and teaches two classes in report writing at St. Louis Community College at Florissant Valley. Some of the papers he has delivered at previous ITCC's are "Data Poisoning and Sex," "Words are Chameleons," "How Can We Cope With Tomorrow's Tecknicall Writeing?", and "The Passive Voice Should be Avoided -- Sometimes." As a hobby he collects grammar books.

SIX PRINCIPLES FOR USING TECHNICAL SHORTHAND

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Shorthand expressions for complex technical terms are very useful in certain circumstances, but their use must be carefully controlled. Six principles are proposed for such control. Shorthand terms should be: 1. Used freely in small-group talk; 2. Outlawed in large-group talks; 3. Defined and used freely in internal documents; 4. Avoided when possible and used only subject to specific limitations in short external documents; 5. Used only subject to additional limitations in long external documents; and 6. Used freely with accompanying definitions in nontextual aids.

I rode down in an elevator recently with a couple of microelectronics engineers. As they got on, one of them was saying, "Are you going to be making both CMOS-SOS [see-mahs-sahs] and MNOS-SOS [em-nahs-sahs] ICs [eye-sees] here in MDMC [em-dee-em-see]?"

The other one answered, "Yeah. They're both part of the USAF [you-saf] VHSIC [vee-sik] program. But the gallium arsenide J-FETs [jay-fets] are staying out in MDAC [em-dak] on the coast."

The elevator stopped and as they got off, the first engineer was saying, "We haven't gotten into VLSI [vee-el-ess-eye] yet, but we're looking at MOSFETs [mahs-fets]...." I couldn't hear the rest, and it's probably just as well.

I relate this conversation to make two points that are basic to my talk:

- Acronyms, initialisms, and abbreviations are an extremely useful form of shorthand, but
- That shorthand, like any other code, is useful only to those skilled in its use.

The usefulness of this shorthand is easy to understand. Just imagine that first engineer asking about complementary-metal-oxide semiconductor/silicon-on-sapphire integrated circuits instead of saying CMOS-SOS ICs. Among people who work with and talk about these things all day, the birth of a shorthand notation is inevitable.

From this brief discussion I derive the first of the six principles I propose for governing the use of acronyms, initialisms, and abbreviations[*]:

1. *Shorthand terms should be allowed, even encouraged, in talk among members of a small group of experts.*

However, you who are strangers to microelectronics shoptalk as practiced at McDonnell Douglas will attest to the impenetrability of that shorthand to the uninitiated. Your baffled response to that elevator conversation is intended to underscore my second point, that shoptalk and jargon are not only not useful outside the circle of initiates, they are irritating and counterproductive.

To illustrate that point a little further, let me tell you about one of my former bosses. As Corporate Vice President for Engineering and Research, Harold was required to review each year's research and development projects and approve the budget for the next year's work. Accordingly, once each year every investigator had to stand up before Harold and his staff and other interested executives and tell what he had been doing and what he would like to do.

These presentations were classic examples of an insider talking to a bunch of outsiders. The researcher, who was up to his ears in his project, would stand there and talk about his JFETs or MOSFETs or whatever and the eyes of the audience would promptly glaze over. So Harold got irritated and started interrupting. "What's a JFET?" he'd say. "Tell me again what a MOSFET is," he'd say.

After a while, the researchers began to be a little more careful to define and explain their strange terms, but most of them never reached the point of zero interruptions. Even if they defined every term when it was first used, they found that Harold often couldn't remember all of them clear to the end of the talk. It's like being exposed to a foreign language for the first time: how many strange terms can *you* carry in short-term memory? For most of us, the answer is not many.

In most speech situations the listener can't interrupt the way Harold could, and there is no chance to refer back to an early definition. Consequently the average listener simply gets lost. Hence my second principle:

2. *Shorthand terms should be outlawed in talks to large groups, or even in talks to small groups if they represent varied backgrounds.*

To this point we've been talking about using shorthand terms in speech. Let me turn now to the question of using them in writing.

For the same reason that they are useful in speech, they are also useful in writing. Everyone has had the experience of taking notes in a class, in a conference, in a library, or on the phone, and we all know how convenient it is to be able to abbreviate. Similarly, in writing memos and letters and notes to our colleagues we find shorthand terms quick and easy to use.

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[*] *Incidentally, in the use of these terms I follow the practice of Ellen Crowley, editor of the Acronyms, Initialisms, and Abbreviations Dictionary.*[1] *She defines an acronym as the initial letters of two or more words, spoken as a word, like radar; an initialism also as the initial letters of two or more words, but pronounced as letters, as GPO or rpm; and an abbreviation as a short written form of one or more words that are usually pronounced in full, as Dr. or Dec. On several occasions I use "shorthand" or "shorthand terms" to stand for acronyms, initialisms, and abbreviations.*

But how many have had the experience of trying to decipher a set of class notes a year or more later? Or a cryptic record of a telephone conversation pulled from a file months afterwards? How many have been handed a copy of a memo addressed to someone in another technical group and therefore full of strange and unexplained terms?

These questions are intended to emphasize two differences between oral and written communication:

- Written communication is permanent, for all practical purposes, and can be pulled from storage and read by anyone at any time in the future, whereas speech is nearly always immediate and ephemeral.
- Written communications are under the control of the receiver and can be distributed far beyond their primary audience, whereas spoken communication is normally controlled by the speaker and directed to a specific, known audience.

Because of these characteristics of writing — its permanence and its uncontrolled distribution — we who write an internal memo or report do not have the same freedom as the speaker in a small group: we cannot use shorthand at will. Instead, we must obey the third principle:

3. Shorthand terms should be defined at first use and used freely thereafter in an internal document.

The inclusion of a definition does not significantly slow up the knowledgeable reader, but the presence of the definition helps the uninitiated reader, whether today or ten years from now.

This situation, incidentally, is the only one where the generally quoted rule[2] regarding shorthand terms is applicable. When most of the intended readers are expected to know the code, its use is as efficient in writing as it is in small-group talk.

However, the general rule does not apply to external documents, or even to general-circulation internal documents. I had to learn that lesson the hard way, so let me pass along my experience.

I publish a monthly bulletin of technical information that is distributed throughout the corporation to more than 14,000 engineers and scientists in many geographical locations, in many different organizations, and in many technical disciplines. Its purpose is to keep all those readers generally informed about what their colleagues are doing and to encourage them to pick up a telephone and talk to each other.

I used to assume that if I, a non-engineer and a generalist, recognized a shorthand term in copy submitted to me, then surely all those technical specialist readers would recognize it, so I would leave the term in the copy. If I didn't recognize an expression, I would insert a definition at its first appearance and then use it freely, in accordance with the general rule.

Now it happens that I also print a little sidebar item in each issue that discusses some aspect of technical communication. One of these items several years ago warned against the too-free use of acronyms and restated the general rule about defining them at first use. A number of readers promptly jumped all over me. For example, one sent me his marked-up copy of that issue showing how many terms had been used without definition, in violation of the general rule. (These were the terms that I had assumed everyone knew, like MDC for McDonnell Douglas Corporation.)

Another sent me his copy of the bulletin with every acronym and initialism circled in red—it looked like a kid with measles.

And enough others made similar comments that it gave me reason to question not only my assumption but the general rule as well.

It was about this time that Harold took over Corporate Engineering and Research and I became aware of his aversion to insider jargon. Accordingly, I resolved to try an experiment: I would publish my bulletin of technical information without using acronyms or abbreviation at all.

In the years since then several things have happened: I have learned ways of avoiding the use of shorthand without unduly sacrificing brevity, reading ease, or clarity; I have demonstrated, I think, that highly technical material can be discussed in generally understandable terms; and I have had several heated discussions with disgruntled authors who feel that it is the readers' responsibility to master the writer's vocabulary.

As a result of this experience I have derived three additional principles. The first of these is based on my belief that shorthand terms should be avoided if possible in external documents and general-circulation internal documents. It is clear to me that these terms are not necessary most of the time if the writer will take the trouble to write around them. (Unfortunately, as Don Bush has remarked, the writer always thinks they're more useful than the reader does).

Here are a couple of obvious techniques for avoiding acronyms and initialisms:

- Once a complex term has been introduced, use a shortened form of it, such as *the corporation* for McDonnell Douglas Corporation, or *the circuit* for gallium arsenide integrated circuit.
- Use a demonstrative adjective or pronoun in place of a complex term when the reference is clear: The very-large-scale-integration program.... This program is.... It has....

Unfortunately, it is not always possible to avoid using some form of shorthand without burdening the writing (and the reader) with annoying repetitions of long, complex phrases. For example, if we were comparing two kinds of integrated circuits, the complementary-metal-oxide semiconductor and the metal-nitride-oxide semiconductor, shortened forms would be difficult to create, and references to "the former" and "the latter" can go only so far before they get confusing.

For such instances I have derived a fourth principle:

4. Shorthand terms should be avoided when possible in short external documents or general-circulation internal documents, but they may be used under the following conditions:
  - *No shortened version of the term is practical*
  - *The term must be used repeatedly—i.e., more than two or three times*
  - *No more than five terms are used in the document.*

The first of these conditions has already been discussed. The second has been implied but bears more emphasis: I have seen innumerable instances in which a writer carefully obeys the general rule and defines an acronym or initialism and then never refers to it again. The third condition has also been referred to earlier in the question about how many new terms the average person can carry in short-term memory: the answer is probably more than two but surely fewer than ten.

The argument could be made, of course, that in a long document the maximum number of shorthand terms might necessarily exceed the limit set by principle four. Further, it can be argued that in a document the reader can always refer back to a term's first use and definition, or even to a glossary, to refresh his memory. Both arguments are true, though readers might have some trouble in locating early definitions in a long document, where discussions of a complex term might occur in widely separated sections.

Consideration of those arguments has led me to formulate a fifth principle:

5. *Shorthand terms that are used in a long document should be handled generally in accordance with the fourth principle, but they should also be treated like mathematical symbols; that is, they should also be defined at every new appearance ("new" meaning separated by extended intervening text), and if there are more than a few terms, they should be collected and defined in a glossary.*

Now we have talked about the use of shorthand terms in speech and in text. One other possibility exists: their use in tables and illustrations. It is easy to argue and easy to accept that space limitations in non-textual aids make the use of shorthand terms essential. However, the problem of the listeners and the readers is the same: neither listener nor reader will understand strange terms in a chart or table, and neither will they be likely to remember previous definitions in the text. It is simple to conclude therefore that figures and tables should be capable of standing alone.

From that conclusion comes the sixth principle:

6. *Shorthand terms should be used to conserve space in figures and tables, but they should be defined in a key, caption, or note.*

A few other comments need to be made also. For one thing, acronyms and initialisms that have been formalized as registered trademarks can be used without definition if they are generally recognized. For example, IBM is such a registered mark, as is NCR; others that would require definition include TIE, the title of my engineering bulletin; MCAUTO, the name of one of our divisional companies; and CP/M, the name of a microcomputer operating system.

Similarly, if you have occasion to write the titles of published works, as I do, and if the titles contain acronyms and abbreviations, as many of them do, you are constrained to leave them in. As a result, my bulletin lists publications with titles like "The STS/PAM Thermal Vacuum Tests," "Exo-atmospheric LWIR Discrimination," "Damage and Repair of the APS," and the best of all, "VTXTS - A Cooperative Effort between User, CNATRA, and MDC." (All of these, incidentally, are from a single issue of the bulletin, but they don't exhaust the list, so you begin to get an idea of the magnitude of the problem.)

A special caution is in order concerning computer acronyms and mnemonics. Programmers apparently spend more time creating a cute acronym for a program title than they do in creating the program; you know, like OMEGA, standing for order management to expedite and guide acquisition, whatever that means; or OSCAR, standing for operations, scheduling, control, and reporting (and for several other equally contrived names, according to my dictionary). Programmers will fight bitterly to get these creations into the text, and always in capital letters.

A similar fixation on acronyms and abbreviations sometimes afflicts non-programmers as well. I remember one man who asked me to review a report he had written for corporate management. The report was a long-range plan for computer-aided engineering and -manufacturing in McDonnell Douglas. Throughout the report he referred to the MDC CAE/CAM LRP. That monstrous set of initials appeared several times on every page, and he resisted giving up a single letter of it, and although we ultimately got it down to "the plan" or "this plan," it was a tough fight.

Finally, let me say a word about the proliferation of acronyms and initialisms and about the resulting dangers. The third-quarter issue of our journal last year carried an article by Mary Bucher proposing a remedy for what she called "abbreviomania." Her solution was to create an in-house dictionary of technical abbreviations so that everyone could translate everyone else's writing. The first list, she says, had 82 terms; the third annual updated edition had grown to over 800 terms.

The dictionary that I referred to earlier, published by one of our component companies, has 537 pages containing more than 65 terms each—that's almost 35,000 terms. And a glance through it shows that in every column there are many repeated entries; that is, there are 16 meanings for AB, 19 for ASR, and 25 for ATS, to cite just a few examples. No writer should assume that everyone will understand *his* ATS.

The lesson taught by those observations is obvious, I hope, and it brings me back to my thesis: shorthand terms are highly useful in the proper context, but their use must be tightly controlled. To control them, I propose that we follow these six principles:

1. In talk among members of a small group of experts, shorthand terms should be allowed, even encouraged.
2. In talks to large groups, or even in talks to small groups if they represent varied backgrounds, shorthand terms should be outlawed.
3. In an internal document, shorthand terms should be defined at first use and used freely thereafter.
4. In short external documents or general-circulation internal documents, shorthand terms may be used subject to the following conditions:
   - No shortened version of the term is practical
   - The term must be used repeatedly—i.e., more than two or three times
   - No more than five terms are used in the document.
5. In a long document, shorthand terms should be handled generally in accordance with the fourth principle, but they should also be treated like mathematical symbols; that is, they should be defined at every new appearance ("new" meaning separated by extended intervening text), and if there are more than a few terms, they should be collected and defined in a glossary.
6. In figures and tables, shorthand terms should be used to conserve space, but they should be defined in a key, caption, or note.

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2. Typical of many statements is that in Charles T. Brusaw, Gerald J. Alred, and Walter E. Oliu, editors, *Handbook of Technical Writing* (New York: St. Martin's Press, 1976): "Except for commonly used abbreviations (U.S.A., p.m.), a term to be abbreviated should be spelled out the first time it is used, with the abbreviation enclosed in parentheses following the term. Thereafter, the abbreviation can be used with confidence that the reader will understand its meaning." (page 3)

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DIALOGUE:
THE KEY TO PROFESSIONALISM IN TECHNICAL COMMUNICATION

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This paper is a summary of my experiences with editorial dialogue. I was introduced to editorial dialogue during my graduate studies in the Technical and Professional Writing program at New Mexico State University. I learned the theoretical bases of editorial dialogue and some practical guidelines for its application, both of which I summarize in this paper. I then gained the opportunity to apply the techniques in a one-year internship arranged by the university. During the internship I served as the only technical editor for 100 scientists and engineers at a government research laboratory. My experiences at that laboratory, described briefly in this paper, convinced me that editorial dialogue is eminently workable in the real world. In fact, I have concluded that dialogue between writers and editors is the key to the production of professional quality technical documents.

BACKGROUND

My introduction to editorial dialogue came during my graduate studies in the Technical and Professional Writing program at New Mexico State University (NMSU). At NMSU I had the good fortune to study with Mary S. Hageman, Patrick M. Kelley, and Louise M. Vest, whose papers in the 28th and 29th ITCC Proceedings summarize the theoretical bases of editorial dialogue and provide some practical guidelines for its application. I recommend these papers as required reading for anyone interested in editorial dialogue, but I will briefly summarize their contents in this section.

First, I should point out that in this paper I use dialogue, editorial dialogue, and dialogic editing synonymously. Also, for the sake of brevity, I use dialogue as a verb to mean "work together in a dialogic relationship." Dialogue, in the context of this paper, is a personal interaction characterized by the intense empathy of the participants (Kelley). It is suggested by an "I-Thou" working relationship, as contrasted to an "Us versus Them" or "Us versus It" relationship (Kelley; Vest and Hageman; Hageman, Vest, and Kelley). The latter two relationships are the natural products of the traditional linear writing-editing process, in which the writer and editor work independently of each other in a linear sequence. The best relationship this process can produce is the moderately adversarial "Us versus Them," while any animosity within the process will produce the "Us versus It" relationship.

The six major components of dialogue, developed by Richard L. Johannesen, are genuineness, accurate empathetic understanding, unconditional positive regard, presentness, spirit of mutual equality, and supportive psychological climate (Hageman, Vest, and Kelley). Naturally, these six components represent the ideal toward which we should aspire, not the minimum requirements of effective dialogue. Practitioners must be careful to maintain consistent effort in striving toward these goals, however, because it is easy to slip into the false dialogue that is characterized by the attempt to manipulate the "Thou." In their three papers in the 28th and 29th ITCC Proceedings, Hageman, Vest, and Kelley offer specific guidelines to help writers and editors in their aspiration toward these ideals. Rather than repeating those guidelines here, I will offer this tremendously simplified guideline: in a dialogic relationship, each participant must strive to treat the other as he/she would want the other to treat him/her. Although this is an incomplete definition, it does allow the reader to capture the essence of dialogue.

OPPORTUNITY

I was immediately attracted to dialogue as a concept, but I was cynical about the practicality of applying it in the real world. The students in the writing workshops at NMSU were able to apply it effectively, but that environment was not sufficiently real-world to convince me of the universal practicality of the concept. Professor Kelley's guiding hand was always present in the workshops I had experienced, and I wondered if the principles would work effectively without his guidance. I also wondered about applying the principles with participants who had no knowledge of the theories involved. Nevertheless, I resolved to apply the techniques diligently as soon as I got the opportunity.

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That opportunity came quickly, thanks to the faculty at NMSU. I was offered a one-year internship as a technical writer-editor for a government research laboratory. I was the only editor for nearly 100 scientists and engineers who were required to publish technical reports in order to maintain their positions. These reports were primarily summations of research. The length of the reports ranged from 20 to several hundred pages, with the average length around 100 pages. During the year I worked, 50-60 of these reports were printed and distributed, but at any given time we always had 30 or more reports in some phase of processing that involved the editor.

The laboratory already had a good technical editing system in place. An author's draft had to pass a technical review by a fellow scientist before it was submitted to the editor. After the report was edited, it was then given a final review by two other scientists familiar with the topic. The report was printed only after it had successfully passed each of these stages. A definite advantage of this system was that the scientists changed roles as authors and reviewers. This role interchange increased the empathy of the reviewers toward the authors, since they knew they would soon have their own papers reviewed by other scientists. Unfortunately, the system was applied in a linear sequence, thereby resulting in the moderately adversarial "Us versus Them" relationship between the scientists and the editor.

I immediately tried to create an atmosphere of mutually respectful teamwork with the authors. I took every opportunity to show my respect for the writers as technical experts, and I worked to earn their respect as a writing expert. I tried to foster the feeling that the writers and I were combining our different areas of expertise in a nonthreatening way to produce the best possible technical reports. An important way I did this was by making every editorial change open to discussion with the writer.

My normal editing procedure was to review the manuscript alone, marking changes in the text and writing questions in the margins. I then scheduled a mutually convenient conference with the author. At the beginning of the conference, I told the author that everything I had marked on the manuscript was open for discussion. The writer and I then worked our way through the manuscript, spending as much or as little time on each item as the writer preferred. (Of course, if the writer ignored something I thought was important, I initiated discussion of it.) In this way, I learned which aspects of the editing concerned each author: some wanted to discuss every comma, while others were only interested in major revisions. The authors also learned which items I consistently changed, and they were able to adjust their later manuscripts accordingly. I discovered that explaining my changes made me a more competent editor: I learned the rules verbatim and I learned to distinguish between changes that were necessary and those that I simply preferred. I learned to avoid unnecessary changes and to leave the author's voice in the paper.

At first the authors were not sure what I wanted from them during the conferences. They were accustomed to having editorial changes made without their input, and they were concerned that I would patronize them when they asked questions. I also think that they doubted my willingness to discuss thoroughly any questions they had about my editing. However, as the authors came to realize that I meant what I said, they warmed to the task. In only a few instances during the year did any authors remain so uncommitted during the conference that their attitude prevented effective dialogue. (These instances resulted from the authors' being preoccupied with other projects and having a very low level of commitment to the manuscript being edited.) Normally the writers welcomed the opportunity for involvement in the editorial process, and they often pointed out inadvertent errors I had made because of my lack of familiarity with the technical content. The best interaction would take place when an author objected to an editorial change even though she understood my reason for making it. The author and I then bounced ideas back and forth until we found one we both liked. Whenever an interchange like that took place, I always tried to use the author's words when I penciled in the final version. In every instance when an author and I dialogued in that fashion, the paper was judged to be excellent by the reviewers.

RESULTS

An incident with one of the reviewers provides an example of the "Us versus Them" relationship I originally encountered. The reviewer refused to give me a copy of his recommended changes, saying that he would discuss them directly with the author and that I did not need to be involved. While I did not object to his discussion directly with the author, I emphasized to him that I was trying to avoid that linear-type process and would prefer to be involved also. The reviewer finally admitted that he did not want to give me his comments because he thought I would use them to revise the text without first consulting the author. After some discussion, I was able to convince him that such a procedure would be a violation of my editorial philosophy. As the year progressed, the scientists developed trust in me, and incidents such as that were not repeated.

During the year, I noticed a definite correlation between the results of the panel review and my evaluation of the quality of the dialogue between the author and myself. Whenever I judged the dialogue as adequate, the reviewers recommended only minor changes. The only manuscript rejected by the reviewers during my tenure was one in which I knew the author and I had not dialogued effectively. In the two other instances in which I was unable to dialogue effectively with an author, the reviewers allowed the papers to be printed as mediocre reports because they had low priorities and small audiences. I regard these three failures as the exceptions that prove the rule.

Perhaps the most striking aspect of the "I-Thou" relationship that results from dialogue is the effect it has on the participants. I noticed that whenever true dialogue was taking place, I became excited about the project at hand. On the other hand, I had to force myself to keep working when I knew dialogue was not taking place. I sensed the same attitude on the part of the author, and I realized how important dialogue was in affecting the quality of the final product. I think this tremendous power of dialogue to affect the attitudes of the participants is the most important aspect of dialogic editing.

SUMMARY

My experiences with dialogic editing were an unqualified success. The authors and I developed mutual respect and positive regard for one another. I felt that I had become a better editor because of my dialogic experiences, but more than that I could point to several tangible indicators of the success of my experiment with dialogue. I learned the stylistic preferences of individual authors and was able to edit effectively without violating those preferences. Out of more than 50 papers I edited during the year, I was able to dialogue effectively on all but three. The reviewers did not recommend major changes in any papers that resulted from good dialogic editing sessions. Authors were not repeating the same mistakes from one paper to another. Authors were coming in to discuss sections of their papers while they were working on rough drafts. The authors were comfortable in the editing conferences and looked forward to discussing ways to improve their papers. The editing backlog stayed at an acceptable level during the year, confirming that dialogic editing could keep pace with real-world requirements. Finally, I received two cash awards and two letters of commendation for my work during the year, and I was offered a permanent job with the laboratory. I am convinced that these were the direct result of the positive reaction to my dialogic practices.

My experiences with dialogic editing have shown me that the written product is only the final stage of a series of communications that produce it. The quality of the written product is directly dependent upon the quality of the communication that takes place during each of the preceding stages. The importance of dialogue in each stage of communication cannot be overemphasized. My experiences have convinced me that dialogic methods are the key to the professional conduct that creates effective communication during each stage of the process. Dialogue thus becomes the key to the professional quality of the final product. I urge all editors to give dialogic editing a sincere effort; the results could be surprising. The results of my one-year experiment truly amazed me!

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ED239279

THE VOICE OF THE TECHNICAL WRITER

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ABSTRACT

The voice of the writer is implicit in all writing, including technical writing. Voice is the expression of the writer's attitude toward audience, subject, and self. The effective use of voice is made possible by recognizing the three roles that technical writers serve. The roles are: transmitter, translator, and author.

THE ROLE OF VOICE

I have a strange notion, perhaps a condition of my former inclinations as a writer of fiction, but perhaps not, that the voice of the writer is an implicit, inescapable element of all writing, including technical writing. More than that, I have a strange notion that voice is an *essential* element in technical writing, essential because it is, I believe, a primary medium for fully expressing the writer's ideas.

This notion is hardly a popular one. In fact, in some circles, I imagine it is quite unpopular. But I think it has some important implications, and at the very least, deserves a reasonable defense. Let me start with my definition of voice.

> Voice: The expression of the writer's attitude toward subject, audience, and self.

Voice is also, I believe, a medium of translation between thought and the written word. This translation is necessary because the content of the written word begins in thought, and there is an implicit gap between the two that cannot be bridged verbally. As to the nature or existence of that gap between thought and the written word, let me defer for a moment to Marshall McLuhan.

In *Understanding Media*, McLuhan made his now-famous declaration that, "The medium *is* the message." Something else he said on the way to that idea was just as enlightening and especially pertinent to my defense. In discussing the nature of media, McLuhan says:

> The electric light is pure information. It is a medium without a message, as it were, unless it is used to spell out some verbal ad or name. This fact, characteristic of all media, means that the 'content' of any medium is always another medium. The content of writing is speech, just as the written word is the content of print, and print is the content of the telegraph. If it is asked, "What is the content of speech?," it is necessary to say, "It is an actual process of thought, which is in itself nonverbal."[1]

To restate McLuhan, the written word, like electric light, does not have any meaning independent of the thought behind it—it is only pure "medium." Words are not autonomous ideas, but imperfect translations of nonverbal thought processes. They are imperfect just as any translation from one language to another is imperfect, because words *by themselves* cannot carry the full, subjective implications of original thought.

Something intangible—*non-verbal*—is lost when we translate from one language to another. Something intangible and non-verbal is lost when we translate subjective thought into what we hope to be objective words. But voice provides us a medium for recapturing that something lost. It is the medium that bridges the gap, for writer *and* reader, between the subjective and the objective.

I found needed support for my notions in Walker Gibson and his book, *Persona: A Style Study for Writers and Readers*. Gibson begins *Persona* with an introduction in which he says, "In at least some significant ways, the voice, like the medium, is the message."[2] Aside from the reinforcement of McLuhan's ideas, I also got from Gibson an introduction to a side of Aristotle I had not known before, as Gibson's *Persona* is based in part on Aristotle's *Rhetoric*.

Aristotle had an appreciation for the role of non-verbal influences in verbal communication that is very evident in *Rhetoric*. He listed what he considered to be the three principle means of persuasion that a speaker possesses. They are: the character of the speaker, the attitude the speaker creates in his audience, and the logical proof of his argument.

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Not only did Aristotle list the character of the speaker as the "first kind" of persuasion, he followed with this affirmation of just what he meant:

> It is not true, as some writers assume in their treatises on rhetoric, that the personal goodness revealed by the speaker contributes nothing to his power of persuasion; on the contrary, his character may almost be called the most effective means of argument he possesses.[3]

I think it is important to note that rhetoric in Aristotle's time was not the rhetoric of today. I would call Aristotle's rhetoric the technical communication medium of his day, a practice concerned solely with the logical communicating of truths.

Aristotle's contention that even in the realm of logic the character of the communicator is vitally important, is understandable to me in light of the inherent inability of the written or spoken word, of itself, to fully convey the meaning of the thought that preceeded it.

I think this is a principle that advertisers caught on to long ago, and that people in some areas of technical and professional communication are beginning to utilize. The concept of the one-page resume is centered squarely on this principle, for instance.

But where do I go from here? Do I want to see technical writing become fraught with "I's" and "we's" and expressive emotion? Quite obviously, no. What I would like to see is technical writers improving their effectiveness as communicators through the conscious manipulation of appropriate voice.

Roles of the Technical Writer

I have defined three roles for technical writers that I believe open the way toward the effective use of voice in technical writing. Those roles are: transmitter, translator, and author. The technical writer as transmitter transmits data from one level to an audience at the same level. The technical writer as translator translates information from a source at one level to an audience at a different level. And the technical writer as author creates information at one level for an audience at various levels.

I have developed a series of analogies that demonstrates these three roles for technical writers and helps provide an insight into the importance of voice in carrying out those roles.

Guide/Transmitter

For the first analogy, imagine (if you will) a tour guide and an art museum. This particular tour guide really knows little about art--he simply knows what paintings are where in this particular museum. Imagine next his audience--a group of curious people that knows as little about art as the guide does. All the group wants to know is where the pictures are that they have read and heard so much about. In this particular scenario, the guide's job is relatively straightforward. He must simply lead the group around the museum and point out and name each painting. The guide's presence there is certainly not of any great importance, except that he must physically be there to actually guide the group.

But suppose our guide has been recently hired, and his new boss is particularly insistent upon the guide's not getting in the way of the patrons' enjoyment of the paintings. The boss has even gone so far as to tell the guide, "Those people you are guiding shouldn't even know you are there."

The boss's point is well taken. Ideally, the group should not be aware of the guide's presence. Realistically however, the best that the guide can hope to do is to be as unobtrusive a presence as possible--he cannot be invisible. But our guide is not realistic and is very much intimidated by his employer. He gets nervous, and becomes obsessed with carrying out literally the boss's instructions. All of his energy and concentration are devoted to an impossible task.

Consequently, things don't go so well. The guide mumbles repeatedly, and the group has to ask him several times to please speak louder. In his nervous state, he forgets where the Mona Lisa is hanging, and the group's annoyance and impatience grows. Finally, completely frustrated by his inability to be transparent to the group, the guide tries instead to establish a casual rapport with them. He leads them to the last picture, and using his pen as a pointer, motions with a flourish to the painting. The group lets out a simultaneous, horrified gasp, and the guide turns with a start to see that his fountain pen has just spewed black India ink on a million-dollar Michelangelo.

The group leaves the museum disappointed, their most vivid memory one of an inept guide unable to get out of his own way. The inept guide is fired.

What was the guide's mistake? He gave himself an impossible task, and was therefore unable to do even what was possible. The guide was to act as a transmitter of information to an audience that was more or less on the same level as he was. He would have been better able to perform his job if he had had a more realistic view of his own role in the process.

He should have conceded his personal presence as relatively unimportant yet nevertheless unavoidable. By not imposing unrealistic expectations on himself, he would have been better able to relax, to speak to the group in a straightforward manner, and to carry things along much more smoothly. Had he done so, chances are that the group would have left the museum with virtually no memory of the guide himself, because the guide would have made little impression on the group compared to the much more interesting information he was transmitting. In short, the guide's problem was that he was terribly self-conscious, in a very literal sense.

Writer/Transmitter

So it is for technical writers acting as transmitters. The writer's presence is relatively unimportant, but it is also unavoidable. Attempts at "voiceless" writing--overuse of the passive voice, imperative verb forms like "shall" and "will," and the stringent avoidance of first and second person pronouns--become what I think is typically self-conscious. Ironically, what is really important--the message--is lost because self-conscious voice of the writer overwhelms the writer's message.

What the role of transmitter requires of the writer is the conscious application of an appropriate voice, a voice that is as unobtrusive as possible. Unobtrusive means not standing out, which implies a tone of voice that is normal, expected. If the inept guide in my analogy had simply forgotten his boss's directive and just spoken to the group in a normal, conversational tone, his message would have overshadowed his presence, because his message would have had more impact.

Guide/Translator

For my next analogy, again imagine a tour guide and an art museum. However, this tour guide is also an expert art scholar. She is, in fact, a professor of art at a nearby university. Her group or audience consists of students from her classes.

The professor's objective as guide to the group is not merely to point out and name each piece in the museum. She wants to tell her students about the historical background of each of the artists, about the period the artist painted in, and about the impact the piece had on the artist's life and times.

The professor, not being new to her task, is much more confident about her role than was our first guide. She speaks warmly, knowingly about each of the paintings and artists. She remembers what it was like for her as a student seeing these paintings for the first time.

Consequently, she talks and moves at a leisurely pace, pausing often, allowing the students to linger over each painting, wanting them to gain a fuller appreciation of what they are seeing. The students in turn divide their attention between the paintings and the professor. They appreciate both the art they are seeing and the professor's knowledge of that art.

In acting as a translator of information to her students, the professor has effectively recognized the responsibilities she has. She is warm, empathic, understanding. She is the intermediary between her audience and her subject.

The students are not only aware of her presence, they depend upon it. They want the knowledge that she has, so her presence is valued nearly as much as the art itself. In the context of translator, the professor's presence is just as important as her subject.

Writer/Translator

Again, it is the same for technical writers. The writer of an operations manual for a computer is as important to the user of the computer as the computer itself, because without someone to translate, the user cannot operate the computer.

A writer acting as a translator of information typically has an audience that is dependent on that writer's empathic presence. When faced with a strange and incomprehensible keyboard, no user wants to consult a manual that is just as strange and incomprehensible.

The user wants a mentor, a friendly hand—not a cryptic jumble of information written by someone who understands the computer, but not the needs of the person using the computer.

Professional recognition has already been given to the importance of an empathic voice in technical writing as translation. IBM's phrase-coining "user friendly" operator's manuals are an eminent example. Another is the work of three of my colleagues at New Mexico State University, who at the 28th ITCC began establishing technical writing and editing as dialogue. In their paper, "Editorial Dialogue: An Alternative Writer-Editor Relationship," Patrick Kelley, Mary Hageman, and Louise Vest apply to technical writing and editing Richard L. Johannesen's six components of dialogic communication: genuineness; accurate empathic understanding; unconditional positive regard; presentness; spirit of mutual equality; and supportive psychological climate.[4]

While I believe that possibly all six are expressed most fully through voice, empathic understanding and presentness are most clearly expressions of voice, and are the two most vital to the technical writer as translator.

Guide/Author

For my final analogy, imagine one last time one last tour guide and one last art museum. This tour guide is special, however. This particular tour guide is a famous artist, a Pablo Picasso of art museum analogies. And the art museum is full of his art.

His audience is also special. It is an audience of artists and lay people, art scholars and art dunces. It is an audience of variety—all sorts of people from all sorts of lives. The one thing they have in common is that they are all passionate admirers of our analogous Pablo and his art.

As this guide leads this group through this art gallery, the scene is much different from our previous two. Pablo is magnificent, laughing gaily and pointing at this picture, joking, "That was my worst," scowling at that one and not saying a word, telling the story of how this one was painted in the bathroom on a Sunday afternoon. And throughout the tour, the audience, to a person, is transfixed.

They listen with rapt attention to his stories. They laugh loudly at his jokes. They study intently the paintings at which he points. They hang on his every word, not wanting to miss a single smile or growl or giggle. They want to absorb all that they can about this man and his art, because he is his art, and that is what they love.

Writer/Author

In the same way, the persona of the technical writer acting as author becomes as important as, or more important than, the subject on which s/he is writing. The author is free not to assume any set voice. S/he is free to write in whatever voice comes most naturally, to write from the hip, as it were. The writer as author is free to write in such a way as to most fully and effectively communicate with his/her audience.

Now, few of us as technical writers may ever come to the point of writing as authors, but the analogy still holds, I think, all dramatics aside. And the cases are not at all rare.

Those people at the forefront of their professions (or even close to it) who write about their own work are technical writers writing as authors. Everything they have to say or express about their subject is of interest to their readers because it is original with them.

The Nobel Prize-winning physicist who writes a treatise (or novel) about nuclear fusion is a technical writer writing as author. The master mechanic writing a comprehensive manual on the BMW 320i automobile is a technical writer writing as author. And the undistinguished but zealous scholar who writes on a favorite topic is also a technical writer writing as author.

Some of the most informative and entertaining technical material is produced by writers who take on for themselves the "free" voice of the author. Carl Sagan and his acclaimed TV series Cosmos is one outstanding example. Albert Einstein and his notably understandable and entertaining analogies of such complex concepts as relativity is another.

I consider that not only is the free voice used by technical writers as authors helpful in communicating, I believe that it raises technical writing, as a craft and a profession, to its highest level.

But even if some of us never reach that level, or choose that level, all of us as technical communicators can be more effective if we have an accurate understanding of our roles and a refined awareness of the importance of appropriate voice in fulfilling those roles.

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SEEKING "CONNECTEDNESS"

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ABSTRACT

"Connectedness" is a quality characterizing clear, logical, readable technical writing. Descriptions of some little-used and sometimes misused techniques for obtaining this "connectedness" may encourage their use to make reports more understandable. Three major aids to connectedness in writing are use of induction and deduction as tools, awareness of the abstraction levels of words, and use of parallel and subordinate structures. Examples of some other items less important as to content but essential to the recognition of meanings are the use of commas in punctuation, care in choice of titles and subtitles, and graphs and charts as media for communication. A simplified readability formula is given for use only as a signal of possible difficulty for a reader. Guidelines to remedies for some kinds of problems are suggested.

In his excellent book on technical writing [1] Thomas Johnson noted that the chief defect in most badly written technical reports lies in the writers' failure to generalize intelligently at appropriate places in the text. Such writing stays on a static level--a plateau, if you will--where the major types of reasoning go unused. This means that unlucky readers are confronted with an unsorted, unshaped list of material with the "unconnectedness of things." This haphazard listing mixes major and minor points and reads like a catalog, exactly what it is. Missing is the "connectedness," the relationship of parts to whole, the analytical effort, the use of deductive and inductive techniques. Readers are then faced with the task of sorting out and assigning their own interpretation of the relationships.

AIDS TO AWARENESS

The importance of the "connectedness of things" cannot be too strongly emphasized. It is a quality that makes writing easier to read and understand because it flows smoothly and logically. Three aids that are frequently overlooked can raise the awareness of how reasoning structures and language shapes material and can promote the desired connectedness. These aids are: (1) use of deductive and inductive reasoning as organizing tools, (2) use of the abstraction ladder as a vehicle for movement, and (3) use of parallel and subordinate grammatical constructions. These aids have in common the promotion of relating the parts to each other and to the whole, acquiring the connectedness desired of all coherent writing.

Aid One: Inductive and Deductive Tools

The two major types of reasoning (induction and deduction) provide tools for organizing written material into an overall framework that makes relationships evident to the reader. Technical writers should have no difficulty in translating these familiar scientific methods into their writing.

- Inductive reasoning: summing up and generalizing from a number of examples.
- Deductive reasoning: extending a generalization to a specific case, then showing that it leads to a valid conclusion.
- Logical organization: determining where to put the whole and where the parts, choosing one of three approaches--deduction, induction or a combination of the two. In technical writing, it is usually desirable to put the whole before the parts, using the deductive approach.

Aid Two: Moving on the Abstraction Ladder

A second aid, similar to the first in its use for demonstrating the "connectedness of things," is the conscious and deliberate recognition of various levels of abstraction in writing. The order of general to specific moves down the ladder, proceeding from general truths to individual instances, from conclusions to supporting detail. The general (on the top rung) is collective, dealing with groups or classes, and the particular (on the bottom rung) deals with items, persons or things. Abstractions (also at the top) are mental concepts, qualities such as cruelty, love, comfort, efficiency. Concretions (on the bottom) are sensory perceptions such as sights, sounds, warmth.

Just as writers/editors need to grasp the movement of inductive and deductive patterns, so do they need to be tuned in to the movement of language from general to specific, abstract to concrete. To do this, they must be able to locate words on the various rungs of the abstraction ladder and move up or down on it. A few rules should be kept in mind with regard to this movement:

- Limit the abstraction of the subject. Before reducing abstractions in words, examine the level of abstraction of the subject and limit it, if necessary. Do this by closer focusing, much the same as in taking a picture. Leaving the subject any more general than absolutely necessary puts an undue burden upon its development.

- Start at the lowest feasible rung. The higher up the abstraction ladder a subject, idea or word is, the more general it is. Specific ideas are very difficult to communicate using abstractions. Breaking items down into descending logical categories of specifics means reducing abstractions, which is what classification is all about. The whole trip down the ladder aims at finding the word that restricts the meaning to convey a specific idea. For this reason, start as far down the abstraction ladder as possible when making a

- Move on the abstraction ladder. Using many generalities means staying too high on the abstraction ladder--ideas are apt to be vague and open to countless misinterpretations. On the other hand, staying on the lowest level of details, with no generalizations to tie them together into unified packets of meaning, loses the reader in a list of parts with no directions for assembling them. So, although generalization requires starting as far as possible down the ladder, moving up and down is a necessity.

- Recognize inappropriate use of abstractions. Abstractions are not appropriate in most technical writing because they are either unclear, unscientific, or boring.

  1. Abstractions are unclear. Injudicious use of abstractions cripples clarity. Two simple techniques that reduce the high level of abstraction will greatly improve ease in reading. First, eliminate abstract nouns as the subjects of sentences and, second, promote concrete nouns (usually the real subjects) from subordinate positions of mere qualification. With a little practice, anyone can learn to find the real subject and verb of a sentence. Because abstractions pose a threat to clarity, revisions of this kind are well worth the writer's or editor's efforts.

  2. Abstractions are unscientific. Unfortunately, the overuse of general words is a common error. It is far easier to settle for the name of a group of things than to hunt for the precise word further down the ladder to pinpoint a meaning. Language that contains nothing but abstractions is basically inexact and unscientific.

  3. Abstractions are boring. The more specific and concrete writing is, the more vivid and interesting it becomes. Rolling from one generalization or abstraction to another can be the most boring and meaningless writing imaginable.

Aid Three: Parallel and Subordinate Structure

The third aid to improvement of a writer's ability to show the connectedness of things is more effective than the preceding two in that it distinguishes between main ideas and supporting detail. Often when a reader raises baffled eyes from some obscure passage, the source of confusion lies in the sloppy blurring of main and minor details in faulty grammatical construction. This third aid reviews how the correct use of parallel and subordinate grammatical structure sharpens clarity. Revising with this in mind is very rewarding.

"Good" grammatical construction is influenced by:

- Variety in sentences: Simple or compound sentences imply parallel meaning and cannot be used to convey difficult ideas. These require detailed qualifying by modifiers--words, phrases or clauses that are grammatically subordinate. Complex and compound-complex sentences are needed to achieve shades of meaning and accurate relationships.

- Parallel structure for parallel thoughts: Elements that are parallel in thought need to be parallel in structure, either in simple sentences or in independent clauses joined by a coordinating conjunction (e.g., and or but). This "loose" sentence structure eases the prose and makes for a pleasant variety in sentence types but, used excessively, is as monotonous as a child's "primer" style.

- Subordinating structure for supporting ideas: Subordinate constructions signal that the relationships are not equal; some ideas are major and some are minor. The answer to the question of which idea deserves the principal position in the main clause lies in the context. The writer/editor who begins to examine which part of a thought deserves emphasis and which part should be assigned to a supporting role is on the way to becoming a master of the art of controlling material and shaping it to say clearly what is meant.

USE OF AIDS

Although these three aids to awareness for achieving "connectedness" belabor the obvious at times, the obvious needs the beating; for it is sure that regard for these three points is more often conspicuous by its absence than by its presence.

LITTLE THINGS THAT MEAN A LOT

A few words about commas (very tricky at times), writing good titles (a simple device usually helps), and charts and graphs (usually a necessary adjunct to a good report) may clarify use of these essentials of competent report writing as potentially effective in enhancing "connectedness."

Uses of the Comma

Although commas mark slight separations between sentence elements, the pauses are important to make the meaning clear. A brief discussion reviews a few main points about this punctuation mark. Many pages have been written about where and how to use the comma and more pages on exceptions to the rules. So, for a complete account of the intricacies and refinements of usage, consult a good, recent, recognized handbook on composition, such as [2].

The following rules are the major ones to keep in mind:

- Rule 1: Commas must separate introductory clauses and phrases from the main clause, unless those clauses and phrases are very short.

- Rule 2: Commas usually are omitted when an adverbial clause follows the main clause.

- Rule 3: Commas must separate a beginning participial phrase (or an absolute phrase modifying the subject) from a main clause, but verbal modifiers should not be confused with verbals used as nouns.

- Rule 4: Commas must separate the main clause from subsequent phrases and clauses unless they are closely related to the main clause. This means that commas must separate nonrestrictive clauses and phrases from the main clause (also from antecedent nouns they modify). Nonrestrictive information is that which only supplements the meaning; it is not essential to the meaning of the sentence. Restrictive clauses, however, are not parenthetic and should have no commas separating them from the main clauses. They serve to identify and restrict the antecedent nouns. Unlike nonrestrictive clauses, they cannot be separated from the main clause without loss of meaning.

- Rule 5: Commas are used to separate main clauses that are joined by coordinating conjunctions (and, but, or, nor, for, etc.) unless one or both main clauses are very short. Some authorities contend that use of the comma here is optional. Readability is a good test; if a comma makes reading easier, use it.

- Rule 6: Commas can be used to separate very short clauses making up a series.

- Rule 7: Any elements that are essentially parenthetical in nature require separation from the main clause. This is similar to the principle of using commas to separate nonrestrictive from main clauses, as well as to separate subordinate clauses and long phrases at a sentence's beginning from the main clause. Such parenthetical items as persons addressed, appositives, items in addresses and dates, and independent clauses and phrases, all require separation from the main clause.

To conclude remarks about commas, when in doubt whether to use or not to use, examine the meaning and rhythm of a sentence carefully. If clarity is enhanced by the comma, put it in.

Titles and Subtitles

Two big reasons for striving to write good titles are that prospective readers need clues to a report's contents (a "pre" connection), and the explosion of technical information demands informative titles to facilitate information retrieval (the "post" connection).

Most style manuals give inadequate advice on writing titles, suggesting only that they be short and definitive (difficult to achieve without some knowhow) and that they be written after the report is complete [3]. One fairly satisfactory formula for writing well-defined titles lies in composing a two-part title that will convey the subject and the writer's approach to it. The main title gives the general subject; the complementary subtitle expands the main title into specific identification of the report's contents.

Try the following directions for devising titles that do what they are meant to do.

- The main title:
  Use ten words or less.
  Avoid terms in main title such as survey, interim, final, test, research, investigation. The main part of the title should identify the subject. Remember that libraries and computers file material by the first significant word in the title, so check to be sure the title makes adequate connection with the real subject.

- The subtitle:
  Identify results achieved. The writer's approach should be reflected in the subtitle. Identify the kind of report coverage (such as survey, field, final), scope or time period.

- The split title:
  Another suggestion is to break the main title into two parts with a colon, treating the second part as a subtitle.

A printing format can emphasize the difference between the main title and the subtitle. The main title usually appears in larger type (or all caps) at the top center of the title page, with the subtitle below it in smaller type.

Examples of good and bad titles for reports abound. Examine a few critically to see if they meet the standards set forth above, then try to apply the rules to rewrite them into the definitive identification that can be achieved through the two-part title. A little practice works wonders.

Arts for Graphs and Charts

Graphs and charts can provide a special kind of connectedness. Design of them becomes communication, not ornament, when graphic elements are used expressively with a "purposeful relationship of words, pictures, and space" [4].

All graphic illustrations should be labeled so as to be self-explanatory without reference to the text. This means it is necessary to label all axes, columns and rows; define abbreviations and symbols used; and provide reference to the figures (charts) in the text, by number, before they are presented.

ANTIDOTE FOR AILING REPORTS

A Readability Formula

It seems obvious that technical writing should be readable--that's what communication is all about. Efforts to provide "connectedness" go a long way toward achieving readability. Many formulas for determining this quality of writing have been advanced, but readability implies a certain amount of connectedness and ready understanding and thus goes beyond a formula. However, the following simple criteria may indicate where a problem lies in achieving clarity.

1. About 70 percent of the words should have no more than two syllables.
2. Sentences should average no more than 25 words.
3. Paragraphs should average no more than 150 words.

Writing that consistently exceeds these limits is likely to be difficult for a reader. However, take this formula with a grain of salt and use it judiciously.

Possible Remedies

According to George L. Klare [5], a readability formula provides only a "quick and useful prediction of the reading difficulty of text." If much difficulty is indicated, basic changes may be needed rather than "band-aid" remedies such as changing word or sentence length.

Before shortening sentences, six guidelines may help:

- Sentence should generally be brief, but not too many too short.

- The use of active voice is clearer in most cases.

- A statement rather than a question is less ambiguous.

- An affirmative form of statement is preferable.

- The word depth (number of things a reader must store in mind) should be kept to a minimum.
- Word density depends on audience.

Before changing words, consider the following six qualities:

- correct verb form (no verbal subjects)
- number of shorter vs. number of longer words
- frequency and familiarity of words used
- word association value (referral of one word to another used earlier)
- clear antecedents for all pronouns and other reference words (anaphora)
- concreteness vs. abstraction of words (Aid Two)

The readability formula only gives a signal and should not be rigidly applied without first using the lists of guidelines and qualities to evaluate the technical writing. Note that the preceding list of qualities for readability implies some familiar techniques that also improve connectedness. So, "in my beginning is my end."*

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*(Four Quartets, T. S. Eliot)

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ED239280

SELECTING A BUSINESS WRITING CAREER

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Aspiring writers today can find jobs in a variety of communication fields, including the print and broadcast mass media, publishing, teaching, free-lancing, public relations, and business. While many of these fields have long been established as areas where writers can find meaningful careers, the business world has only recently begun opening its doors to members of this profession. The business world offers writers careers in two major areas: internal/external communications and technical documentation. Just as the various communication fields open to aspiring writers today have many similarities and differences among them, so do these two types of business writing careers. Whatever the differences or similarities between them, however, both types of careers have something to offer aspiring writers interested in business. The following comparison will hopefully help future business writers decide which career they want to pursue.

Every year thousands of graduates with degrees in journalism, English, and communications enter the job market. Where do they find jobs? Many go to work for newspapers, magazines, publishing houses, or radio or TV stations. A few teach. Others, after gaining experience, free-lance, submitting articles to magazines and writing on assignment for anyone willing to pay. A very few writers may retire to a run-down farm in New Hampshire and write the great American novel, if they are independently wealthy.

Many other graduates seek writing careers in business. What kinds of writing careers does the business world offer and how do they compare with one another? There are two major categories: internal/external communications and technical documentation. Our purpose in writing this paper is to help new writers select a career by comparing these two areas.

Some people can work in both areas; however, most people probably would be happier working in one area or the other, depending upon their background, skills, interests, and temperament. Whether the differences in the two careers are advantages or disadvantages often depend on individual preferences.

We will compare these two major types of business writing careers in five key areas:

- End products
- Audience/Writing style
- Writing environment
- Skills required
- Opportunities and benefits

End Products

Of course, each major category includes many different types of writing. However, most people are called on to handle many different assignments during their business careers. Technical documentation writers may be asked to write instructions for installing, assembling, testing, operating, or repairing a product. The product may be a specific piece of computer hardware or software, a toy costing a few dollars, or a multi-million-dollar computer system. The technical writer's manuals can be 100 to 1000 pages long and are written in the second person, usually in an active voice.

The communication writer's products are shorter, ranging from a paragraph to 20 pages. These might include a bulletin board announcement, a story for the company newspaper, a brochure, or a press release. The communication writer may assist an engineer or scientist with a technical article for a prestigious journal or write a speech for the laboratory director. He also may be asked to assist in non-writing tasks, such as overseeing a visual presentation at a meeting, or planning special events.

Audience/Writing Style

A technical writer writes for the users of a specific product. Most of the time these are customers of the company, but certain manuals, such as installation and maintenance manuals, may be addressed to other employees of the company. In either case, these audiences generally have a high level of technical knowledge and expertise in a specialized field. They can understand complex concepts and procedures, but they still prefer documentation that is easy to read and use.

The communication writer, on the other hand, usually writes for people, inside and outside of the company, with a variety of backgrounds and education. Most of his internal communications must be understandable by

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the secretary as well as the engineer. Most releases outside the company are non-technical, aimed for the "man on the street." Technical articles usually are written with the help of technical people in the company.

The writing style reflects the different end products and audiences. The technical writer provides "how to" information so that the reader can perform specific tasks, such as customizing, operating, and diagnosing a product. He tries to keep his language and sentence structure simple. He will use technical terms and abbreviations but will define any that his audience might not know when he uses them the first time. In technical writing, the tables and illustrations used are often as important as the text. Two trends increase the importance of illustrations even more: the increasing use of manuals in countries where languages other than English are spoken, and the increasing number of products that are designed to be "set up" by the customer.

The technical writer sticks to the facts, seldom uses superlatives, is never philosophical, and skips the history. The communication writer, on the other hand, tries to be more creative to make his material more interesting to the layman. He might introduce a new encoding technique by noting our debt to Julius Caesar in cryptography or try to evaluate a product's contribution to the "office of the future." The technical writer's illustrations are usually complex diagrams, or isolated products or components. The communication writer, on the other hand, always tries to add human interest to what he writes by including people.

Environment

The differences between the environments of the technical and communication writer are partly a reflection of the different schedules. The technical writer's assignment often begins before there is a product to write about, when it is only an idea in the planning stages, and may continue long after the first products are shipped. He probably works on more than one manual at a time, spending three months to a year on each. Once a writer is assigned to a product, he may spend two to three years writing about that product. This includes writing as many as four new manuals and revising several existing ones. Revisions are usually published concurrently with new releases or updates of the product. Each publication also goes through many review cycles and drafts.

The communication writer, on the other hand, works on many more jobs, each requiring a shorter time. He may spend an hour or a month on a job, and will be working on a number of projects at the same time. Therefore, while both types of writers work with many other people, the technical writer tends to work with fewer and the same people, while the communication writer works with more and different people. The technical writer will spend more time in meetings with technical people.

In large companies with many products, a technical writer probably will be a part of a larger organization than will a communication writer. Typically, communication departments may consist of a dozen or less people while technical documentation groups may number 100 people or more. The larger organizations often have the benefit of more system and personnel support, such as automated text and graphic systems, programming specialists, publication planners, editors, and art, typing, and production departments. Since many parts of a total job are handled by other people, a technical writer can concentrate on obtaining his information and writing. A communication writer, on the other hand, is more likely to be responsible for a job from beginning to end, using his own resources or a vendor. While he is not usually required to do his own final art, he may have to do his own editing, typing, and paste-ups.

Requirements

It goes without saying that a writer needs to be able to write. However, the writing skills required for the two types of writers are somewhat different. Both types of writing must be accurate, but the technical writer must check and recheck minute technical details more often, while the communication writer must be more sensitive to the public relations aspects of whatever he writes. He must not only consider accuracy but the reaction of the people who read what he writes.

However, the technical writer is also concerned with his reader; he must be sure that his reader can understand and carry out his instructions. New concepts in technical writing have been developed to promote this goal, such as "task-oriented" libraries of manuals, and testing manuals in the same way that the products they accompany are tested. As we've already noted, communication writing requires more of a "literary" style in order to capture and hold a reader's interest. Since a technical writer's reader is a captive audience, a user who needs his information, interest is less of a consideration.

A technical writer must have an understanding and interest in technical subjects. He must be able to collect the information that he needs by studying technical specifications and talking to technical people. For this reason, in the past, technical writers have often been ex-engineers, technicians, or programmers. People who have been servicing products can make a particularly valuable contribution because they have used similar manuals and know what information they need to perform a task. Software documentation writers need programming experience so that they can better understand and talk the jargon of programming; and so that they can, if needed, develop or modify example routines in their publications.

In the past, some technical writers have started with few writing skills, but their technical background has more than made up for writing deficiencies. One reason that this has been possible is that some technical writing tasks require a minimum of writing. Some software publications, for example, have large sections devoted to lists of control blocks and instructions. Technical writing may be more structured, allowing individual writers less room for creativity. Technical writers often have to follow guidelines that specify the format of each document and what each part, such as the preface, introduction, and so on, should include. In addition, larger technical writing organizations usually have editors with more writing skills who oversee writing projects, upgrade the writing, and maintain consistency within a publication or set of publications. Finally, technical writers can also spend a considerable part of their time maintaining or updating publications rather than writing new ones.

However, other technical publications, such as introductory manuals for customers, require more writing skill. Inexperienced writers sometimes acquire much of what they need from special classes or self-study. One of the issues long debated in technical writing circles is whether it is easier to teach a technical person writing skills, or a writer the technical knowledge needed. More journalism and communication graduates are being hired for technical writing, but both types will probably continue to be used. The ideal new-hire, of course, is the person with both a technical background and writing experience.

In addition to being able to write well, a communication writer usually needs some knowledge of photography and audio-visual techniques so that he can oversee photographic assignments, select the most appropriate graphics, and put together slide shows. Some experience in speaking before groups is also an asset, for both types of writers, since they may be asked to make presentations.

Both types of writers have deadlines but they are different. The communication writer can have more deadlines and more unexpected deadlines. The technical writer usually knows his deadlines longer in advance but, since his effort for any one task is greater, he must do more planning. If he allows himself to get too far behind, he will never meet his schedules. Because of product cycles, also, the technical writer can get further behind in his work and need to make a larger effort to catch up. On the other hand, the technical writer may be more likely to have occasional slack periods than the communication writer. However, these are generalities that vary from organization to organization.

Communication writers probably work together more on projects while technical writers are more likely to have to work alone for longer periods, except for their contacts with technical sources and service groups such as typing and art departments.

Opportunities and Benefits

There are opportunities for those who enter either type of business writing discussed in this paper. However, there may be more opportunities for promotion, particularly into management, in technical writing because of the larger organizations. Of course, there are some small technical writing groups where the problems of advancement would be the same as in communication writing. People in either group who can and are willing to move to another location have an advantage. Communication writers, because of their contacts with top management, tend to be more visible than technical writers. This can be an advantage if you are a super-achiever, a disadvantage if you are not.

Technical writers are among the first to learn of new technologies and products. They have the satisfaction of knowing that, although much of their work can be dull and routine, their final product is important to the customer and to the company. Their work *is* part of any product, which cannot be shipped or used without their contribution. Few products are perfect, and even if they were, customers could not use them without the instructions from the technical writers.

In addition, technical writers work on a product long enough to become semi-experts, even if they never become as knowledgeable as the engineers and programmers. As a result, they are granted a certain respect by their technical colleagues. Communication writers are looked to for their own expertise in writing, presentation, or public relations, but are always considered neophytes in technical matters, which they usually are.

Just a word about a few other intangible awards. Since so many technical and support people are involved in producing a technical publication, the technical writer often remains unknown to the readers of his publications. Communication writers, however, often are given by-lines and therefore receive more recognition for their work. Even when their name is not formally associated with what they write, the contribution of communication writers may be generally known because of the small size of the group. One person is mainly responsible for the company newspaper, another for the bulletin boards, and so on.

Although opportunities exist for both types of writers, there may be more opportunities for the technical writer to continue his education. In fact, it may be a requirement in order for him to keep abreast of advancing technology. The technical writer also may have more opportunities to travel, especially outside the United States, in order to meet with customers or technology groups. In our company, there are also a few temporary foreign assignments, but usually only for technical writers.

However, a communication writer can also take in a few airports, if that is his desire, and he has a good reason, such as coming to this conference.

TODAY'S NONTECHNICAL WRITERS AND EDITORS IN TOMORROW'S "ELECTRONIC MEGA-COTTAGE" WORLD OF WORK: WILL THEY SURVIVE? [1]

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Today's typical nontechnical writers and editors in business and industry must process information more intelligently to suvive the impact of the computer word-processor. Retooling will be difficult because their nontechnical backgrounds and predisposition toward language *per se* costrict their view of how they can operate most effectively; their linguistic ablities render them textually bound; they sometimes view word processors as computer devices best used by technical typists and clericals; management traditionally takes a narrow view of their job skills and aptitudes; and increasingly sophisticated software enables hard-working clericals to use word processors effectively. To survive, today's writers and editors must open their eyes, master the word processor and use it effectively, grasp the "big picture" of document and information processing, and, at all levels, perform as information processing managers, not as wordsmiths only.

To paraphrase Isaac Asimov, in a few years you and I will enter a room and see two people feverishly scribbling on paper in a dimly lit corner; you will turn to me and ask, "What in the world are those two people doing over there?" And, sage that I am, I will whisper, "Oh, they're the last of a whole group who used to do what was once known as technical writing and editing." [2]

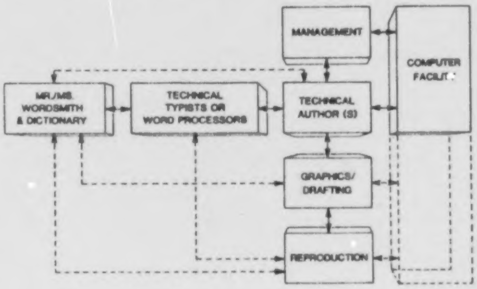
Asimov's point is well taken: Computer technology is already rendering obsolete the old ways in which we were accustomed to writing, editing, and processing documents. Today is a complex "electronic mega-cottage" world of work. Those of us who deny (or resist) the validity of Asimov's vision of what is, in many important ways, already a reality today, are destined to go the way of the early office Remington. Today's electronic imperative--process information intelligently or perish--applies to a whole species of writers and editors who must heed the several dictates of the imperative or wind up in the high-technology boneyard.

It is an indisputable fact that the basic process--not the intrinsic nature--of document generation (the planning, organizing, researching, writing, rewriting, illustrating, printing, packaging, and managing) has been radically changed by the advent of the macro/micro word processor. Moreover, that process has yet to run its complete logical course. Another defensible statement, and of arguably even greater social and psychological importance for today's writers and editors, is that the machine and its clever software brain are of value only to the extent that even cleverer men and women use such information processing tools in an effective and efficient, and therefore more intelligent, manner. [3]

What are the majority of today's writers and editors in the high-technology workplace a product of, and what is it that they do for the most part, day in and day out? First of all, it is safe to assume that the bulk of them are not technical people by training or inclination. What this means is quite simple: however good they are at wordsmithing, they are not likely to know (or especially care) whether Boltzmann's Constant is of universal application or not. But they may know, a few of them that is, that his name is spelled with two n's, not one. So, by formal education and predisposition, few of them are technical writers in the sense that a Loren Eiseley, an R. Buckminster Fuller, or any Dr. Whitenoise is a technical writer.

Such people are writers and editors, yes, but not in the sense that they can generate their own technical content as a result of their own researching, writing, and editing efforts. Rather, they tend to be more linguistically than technically inclined. And this is as one would expect because many of them are a product of the humanities and the arts, as opposed to the traditional hard sciences. Perhaps this figure illustrates what the traditional, functional role of the nontechnical "technical writer and editor" has been in business and industry. [4]

THE FUNCTION OF TYPICAL WRITERS/EDITORS TODAY



Few of today's writers and editors function other than as indicated in the preceding figure. They were and are wordsmiths, yes, but not the kind of intelligent document processors they must become if they are to compete successfully. Why are they so limited, and perhaps needlessly so for the most part?

There are several cause-and-effect, interrelated reasons for their plight.

(1) Colleges and universities have not done much that I would term significant to help them become better prepared to survive in today's electronically-based business and industrial work place.

(2) Another cause of their limited role is precisely because they are too document-content bound. Ironically, they are too immersed for their own good in the very medium in which they instinctively feel most at home: within the textual thickets of the document itself.

(3) Another is that many of them resist what they do not feel comfortable with. Specifically, many transfer their disinterest in science and math to word processors; that extension of what Babbage, Laplace, Turing, and von Neumann began--an evolution of computing machines that algorithmically solved complex number-based problems--poses its dual math-machine risks for them.

(4) Another related factor that contributes to today's imperiled ranks of writers and editors lies in management's rather narrow view of what they can effectively accomplish while on the job. After all, is there not some measure of justification for management's view of them as mere word "checkers" and "hallway expeditors," as opposed to being viewed as major contributors to the final end-product? A given manager, whether a technical type or not, all too often views his/her wordsmith as precisely that; they are men and women who have only a good grasp of grammar, punctuation, syntax (whatever that was), sense of style (as opposed to technocratese), and on and on.

(5) Software writers and their end-product also pose a threat to the livelihood of many of today's writers and editors. Today we have all about us, and at quite reasonable prices, software programs that make almost anyone at the word processor's keyboard a veritable super-Wordsmith. Grammar, word usage, spelling, phrase selection and variation, word count, synonyms, antonyms, and many other forms of linguistic lore usually beyond the ken of most clericals is now--or soon will be--at their very fingertips.

"So what?" you might ask. Why, then, can't all of the writers and editors out there today simply use that software to their own best advantage? In fact, you might, if so inclined, express the ideal synergistic writer/editor-word processor relationship in this fashion:

$$R_t : H_c + S_s :: N_d : T_{w+e}$$

or

$$\frac{R_t}{H_c + S_s} = \frac{N_d}{T_{w+e}}$$

where

R_t = Rate of text generation
H_c = Hardware capacity
S_s = Software sophistication
N_d = Number of drafts
T_{w+e} = Time available for writing and editing

Let's summarize the rationale of those who wholeheartedly ascribe to such notions. It goes something like this. If wordsmiths do become even more immersed in text, as the above expressions posit, then the end-product will be all that much better and their lot will be, therefore, much more secure. After-all, an increase in the rate of textual generation means a decrease in draft turnaround time, which, of course, permits more drafts to be generated for any give document; further, because the extent of the wordsmithing function at the textual level is extensive, wordsmiths are therefore performing in management's eyes in the best of all possible manners.

But is there really all that much corporate time available for wordsmiths to sit at their keyboards and electronically cut-and-paste and polish to their heart's content? The answer, of course, must be no. The above equation does not axiomatically apply in most work situations. Management is what and where it is because it rests much of its entire existence on the fact that time still equals money; consequently, there is a point known as language-attention overkill, which, I suspect, most management will always unequivocally insist on pointing out in light of their own perceived list of priorities.

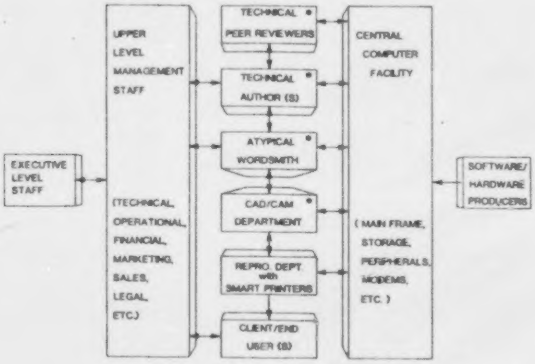
Then, there is this somewhat negative notion to consider: management may elect to rely on clericals instead of B.A. English Wordsmiths to operate the word processors. If that were to occur, management then will obviously let go many of their less multi-talented writers and editors. Many of the lackluster ones will be replaced by bright technical typists who quickly make the transition over to the word processor, by the abler clericals, and by those writers and editors who can function within the text while at the CRT and externally to the CRT's text as well. In short, they'll also have to function as document designers and document processing managers on the management staff and project operational level.

But that transition will not be easy even for the best, brightest, and most adaptable of writers and editors. Robbin Battison, et al, offers in Simply Stated, this paraphrase of Mary Vaiana's view that even "communications analysts" will have a tough time getting management's unqualified endorsement, however much such people are needed: "Many organizations that could benefit from the kind of communication planning that CAs (or document designers) do cannot easily accept this type of innovation. To be successful, this type of program needs the backing of top administrators as well as professional staff in an organization." [5]

Consequently, not all of today's writers and editors will be asked or permitted by management to function, in Peter McWilliams sense of the term, as the ultimate processors of a document's textual content.[6]

How can one depict the functional role that the more fortunate of today's "nontechnical" writers and editors will have to play if they are to avoid early retirement? The following two figures show how centrally positioned, and yet diversely involved, I believe they must become in the information generation and management process if they are to overcome their built-in obsolescence. [7]

THE FUNCTION OF ATYPICAL WRITERS/EDITORS TOMORROW


UPPER
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PEER REVIEWERS
TECHNICAL •
AUTHOR (S)
ATYPICAL •
WORDSMITH
CAD/CAM •
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REPRO. DEPT
with
SMART PRINTERS
CLIENT/END
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CENTRAL
COMPUTER
FACILITY
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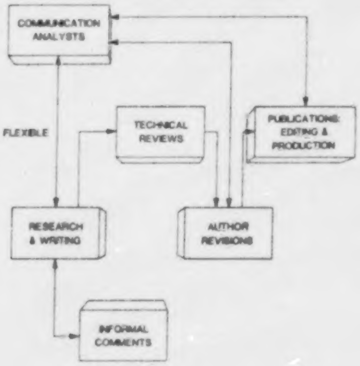
STORAGE,
PERIPHERALS,
MODEMS,
ETC.)
SOFTWARE/
HARDWARE
PRODUCERS

• INDICATES WORD PROCESSORS & PRINTERS

TECHNICAL REVIEW PROCESS


COMMUNICATION
ANALYSTS
FLEXIBLE
TECHNICAL
REVIEWS
PUBLICATIONS:
EDITING &
PRODUCTION
RESEARCH
& WRITING
AUTHOR
REVISIONS
INFORMAL
COMMENTS

What more must today's writers and editors do to avoid the dictates of the electronic imperative? In addition to going to the word processors in a timely, willing, and intelligent fashion, they must also do much of the following if they are to survive.

(1) They must realize that their place within the high-technology world is very much in jeopardy. Knowing that will, in itself, give them an edge over those who will never admit to the validity of Asimov's picture of what the future holds with respect to our relationship with the computer.

(2) They must intentionally adopt the big view of an organization's documentation process, as opposed to the narrow "I am a wordsmith first and last" view.

(3) They must try to get in on upper-level management projects; proposal writing efforts and key report generation tasks are activities that--if done well--make it more likely that management will view the individual as more valuable than the stereotypical writer-editor.

(4) According to Dr. Vaiana of the Rand Corporation, they might also attempt the following: channel research efforts; offer valuable perspective on the internal "logic" of the document's organization and content/idea development; question in a positive and constructive manner the document's basic purpose in terms of its stated and implied meaning or basic message to the reader/user; maintain a posture of real job-task flexibility; suggest structural improvements of major proportions and of a fundamental nature; write research briefs and summaries for those whose first language is not English (many humanities majors have had foreign language training, whereas many engineers and scientists have not); and interface with technical and non-technical management and staff support personnel on as many levels as possible. [8]

(5) I would encourage writers and editors to become more acutely attuned to the political and other power bases within their organizations. They should understand how their organization is internally structured (not always what the organizational charts indicate); and that middle- and upper-level management will ultimately rely a great deal on people who can maximize the word processor's potential.

(6) Finally, writers and editors should become more than marginally computer literate. Taking computer programming language courses and knowing something of the computer's early history will give them a grasp of how today's technology evolved. Such an overview will serve as another means of getting our noses out of documents and our minds into the larger information processing "loop," of which the word processor is a vital and key segment.

Bacon's famous adage would seem to have some relevance: "knowledge is power." We need not become "computer hackers" to survive but only less the typical writers and editors that many of us are if we hope to still be on the job when a Wang or a Winchester sells for $99.95.

NOTES

[1] The basic content of this essay appeared as "The Electronic Imperative: Process Information Intelligently or Perish" in the IEEE Transactions on Professional Communication, March 1983, and is printed herein with permission of IEEE. (The phrase, "electronic mega-cottage," is my alteration of Alvin Toffler's phrase, "electronic cottage.")

[2] Isaac Asimov, "The Feeling of Power," Nine Tomorrows: Tales of the Near Future, Doubleday: Garden City, NY, 1959, pp. 75-85.

[3] In this connection, the author acknowledges the intelligent editorial suggestions and skillful processsing accorded this manuscript by Ms. Karen Trossevin, formerly Assistant Publications Manager and Senior Technical Writer with SIMCON Inc., a computer consulting firm based in Washington, D.C.

[4] The author thanks Mr. Bruce Flowers for kindly having the figures produced and for replicating Dr. Vaiana's.

[5] Dr. Mary Vaiana, "Communication Analysts and Their Role in Institutional Writing," a presentation made at a seminar held in January, 1982, at the Document Design Center, American Institutes for Research, Washington, D.C., as paraphrased by editors Robbin battison, et al, in Simply Stated, No. 24, February-March, 1982 (p. 2), a monthly newsletter of the Document Design Center, American Institutes for Research, Washington, D.C.

[6] Peter A. McWilliams, The Word Processing Book: A Short Course In Computer Literacy, Prelude Press: Los Angeles, 1982.

[7] Vaiana, Simply Stated, p. 2.

[8] Vaiana, Simply Stated, p. 2.

BUGLES AND DRUMS
MILITARY ASPECTS OF WRITING/EDITING

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As a technical writer concerned mostly with Military manuals for most of my 27 years experience in technical communication, I have long felt there has not been enough emphasis placed on Military aspects within the Society for Technical Communication. Since the Government, by virtue of their large expenditures for documentation, is the largest single customer for our products, it should follow that Military publications get more attention. It was, therefore, very satisfying to see the overflowing crowd during one of the few Military-oriented sessions at the ITCC in Boston last year. It proved that the interest is there, and I encourage those of you engaged in Military documentation to speak up, present a paper, and share your knowledge and your problems with us.

While each branch of the Military uses its own Specifications, the intent is common. We need to present the required operation and maintenance data as clearly and simply as possible. Reading grade level measurements and preferred verb lists are two of the concepts toward this goal.

The Army uses the "new look" approach of MIL-M-63036 and -63038, with liberal use of simplified illustrations, color, and easy to read highlighted text.

The Navy, Air Force in certain situations, and to varying degrees the U.S. Postal Service, Weather Service, and FAA to name a few, are using versions of a Functionally Oriented Maintenance Manual (MIL-M-24100 FOMM) concept, in which large format pages are used to show both functional as well as physical (hardware) groupings in order to present the needed information. The use of Fault-Logic tree charts to present troubleshooting information is another concept being used in broader applications in recent years.

Many of the new approaches first used by the Military are adapted for commercial use after being successfully field-tested. With this in mind, I am sure that all of us in the Society can benefit from the information presented by our panelists.

COMPUTERIZED MASTER COLLECTION SYSTEM SAVES RESOURCES

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ABSTRACT

Application of a computer-aided specification preparation system, known as EDITSPEC, results in production of higher-quality project specifications and uses fewer resources. Specifications produced by EDITSPEC are more complete, accurate, and consistent. Use of EDITSPEC reduces the elapsed time, specification writer and typist time, and costs required to produce a project specification. Change orders due to specification errors are reduced, thus lowering total construction costs. Preparing Corps of Engineers guide specifications, program-oriented guide specifications, and project specifications with EDITSPEC are discussed. The benefits and operation of EDITSPEC are also described.

INTRODUCTION

The Construction Engineering Research Laboratory, Corps of Engineers has developed a computer-aided document preparation system known as EDITSPEC. This system allows the maintenance of large collections of documents, known as Masters, that cover a very large and inclusive scope of items. The masters are used to automatically create documents that contain a reduced scope of items. EDITSPEC automatically creates and maintains the consistency of the reduced scope documents with the master document. Changes to the master are automatically posted in the reduced scope documents. Examples of such masters maintained by the Federal government include: (1) General and special provisions in contracts; (2) Criteria for design of building projects; (3) Criteria for construction of building projects; (4) Soldier training and development documents.

Users access EDITSPEC through typewriter terminals and receive output at terminals, or printers. Organizations can use EDITSPEC to produce national masters, regional masters, and reduced scope documents. The general process is presented followed by the EDITSPEC benefits. The preparation of national masters, regional masters, and reduce scope documents with EDITSPEC is defined. The three EDITSPEC operation phases are presented last.

GENERAL PREPARATION PROCESS

National organizations maintain documents known as the Master Collection (MC). Regional offices are required to use the MC documents to produce reduced scope documents (RS) describing their work. MC's cover only the most often applied items. Typical reduced scope documents contain unique text written to address items not covered by MC's. It is often more efficient for regional offices to tailor the MC to the actual region requirements before producing individual reduced scope documents. Such tailored MC are referred to as Regional Masters (RM). The RMs are applied to produced reduced scope documents in lieu of the MC documents.

BENEFITS

Major EDITSPEC benefits are: (1) RSs are more complete, accurate, and consistent when published; (2) The cost of redoing work due to RS deficiency is reduced; (3) Writers' production increased; (4) Typing production increased; (5) Total costs to produce reduced. A more detailed description of the areas in which EDITSPEC provides benefits is presented below.

Master Collection (MC)

(1) Maintained by one office. Individual regional offices no longer maintain the MC locally; (2) Revisions to the MC available to field offices immediately. No printing and mailing delays between approval of a revision and its implementation by field offices.

Regional Masters (RM)

Offices often tailor a MC for a specific set of items. Only unique paragraphs and phrases must be maintained in the RM. No resources will be required to keep a complete MC up to date with the MC document.

Reduced Scope Documents (RS)

(1) The writer is provided with a posted MC. No resources required to post changes prior to application; (2) Technical notes, providing instructions regarding preparation, printed directly after the text to which the note applies; (3) Writers using a MC in RS preparation immediately notified of changes to the MC; (4) The writer provided with a RS containing all relevant MC text. No resources required to manually review and mark up the MC. EDITSPEC automatically pulls all relevant text from the MC and places it into the RS; (5) All referenced publications kept current and updated automatically. No resources required to check the reference publications for current listings; (6) The sources of all text identified. Minimum management resources required to review and approve the unique text; (7) A complete, consistent, and accurate RS is produced for publishing.

Inconsistencies are reported to the writer and must be corrected before the system produces the printing copy; (8) The complete RS with correct paragraph numbers, section identifiers, and page numbers is generated with one computer command. No resources are required to assemble the sections into the final RS and then produce the table of contents.

Computer System

(1) The system has been developed to minimize the life cycle costs of a four-year production period and conversion to a new computer system; (2) The user controls the utilization of computer resources. Interactive, 0 - 24 hour, and 0 - 48 hour batch processing are available; (3) The system is machine independent and maintained by the Corps. (4) The system can be easily moved from one machine to another. (5) Changes in computer systems are virtually transparent.

NATIONAL MASTER PREPARATION

An example applying the Army Corps of Engineers Construction Specification Preparation Process is used to illustrate EDITSPEC's operation. Portions of the Corps MC of specifications entitled "CEGS-07510 BUILT-UP ROOFING" are used to illustrate the process. MCs are written to cover the most frequently encountered items. An actual RS would not contain all items covered by a MC. The first task of the MC writer is to decide what items the MC will cover. The writer forms the item list before any text is written. The list for the example MC is shown in Figure 2. The second task is to form an outline. Once the outline has been established, the writer can begin to write the text, the third task. The fourth and one of the most important tasks is to convey the writer's ideas on when each portion of text should be pulled from the MC and placed into a RS document. While this task may be trivial if each paragraph addresses only one item, it may be very complicated if each phrase in a sentence is written to address a different item. The writer must convey this information as quickly and efficiently as possible. For automation in EDITSPEC, this information is conveyed by having the writer mark the the handwritten text. The contents of a MC can be divided into three classifications: (1) tables, (2) variable phrases, and (3) normal text. The method for marking text for each classification is presented below.

Tables

The writer must indicate under which items each column and each row should be pulled from the MC and placed into the RS. This information is indicated by writing the numbers of each item that would require use of the row to the left of the row. For columns, the writer indicates the items by placing them above the columns.

Variable Phrases

MCs may contain phrases that vary depending on the item. Phrases are normally, but not necessarily, marked in the MC by the use of open and closed brackets ([ ]). There is usually a fixed set of replacement phrases for each variable phrase. For automation, each variable phrase in the text is marked with a flag and each unique flag is given an identifier number. All possible choices for a flag (phrase) are defined in the order of the simplest to the most complicated. The writer marks the items for each phrase to the left of the phrase definition.

Normal Text

When the text to be marked is several lines long, a bracket at the left margin can be used to indicate the text. When the text to be marked is only a few words long, the numbers are written above the text. A slash and a dash are used to indicate the start of the phrase and a dash and a slash are used to indicate the end of the phrase.

The marked-up text and the item list are given to an EDITSPEC operator, who enters the text and translates the markings to computer commands. The operator removes the actual text of each referenced publication and replaces it with a computer command requesting that this information be copied from the master reference publication list only when a print request is issued. This permits the master reference publication list to be maintained at one location and ensures the inclusion of the latest publication within the MC. Since changes are made directly within the MC, eliminating the need for pages which must be posted by field personnel, changes are immediately available to all field personnel in posted form. When changes are made to a MC, the operator issues an "update message" command. EDITSPEC sends one update message for each RS currently applying the MC. The writer will receive the message as soon as he enters EDITSPEC. Errors found by field personnel are reported by telephone to the EDITSPEC "HOT

LINE." HOT LINE personnel correct the reported errors and issue corrections to the field immediately.

REGIONAL MASTER PREPARATION

It is often advantageous for a regional office to tailor a MC or a portion of the MC for local conditions. The tailored text is applied to produce the RS in lieu of the original MC. When a complete MC is tailored, it is stored in its entirety under an office MC name. For example, if Huntsville Division (Corps office 87) tailored MC CEGS-07510.00, the name of the regional master (RM) would be 87GS07510.00. When only a few lines of text require tailoring, the tailored text is the only text stored in the document. A tailored MC may also be written to cover items frequently encountered by an office that are not covered by the current MC on the subject matter.

REDUCED SCOPE DOCUMENT PREPARATION

Generation

Preparation of a reduced scope document (RS) begins by obtaining the master MC index and marking the index to indicate those MCs that will be used for the RS. The marked index is given to an EDITSPEC operator, who enters the selections and obtains an item list and text for each MC that has been selected. This item list contains all items covered by the MC. The writer reviews the requirements and marks the checklist as follows: (1) Checks the items that are in the RS; (2) Marks (X) the items that are not in the RS; (3) Leaves items that are currently undecided unmarked. A creation (concept design) example is shown in Figure 1. The marked checklist is given in the concept column of Figure 2. The writer decides which MC sections are to be applied in lieu of and in addition to the MCs and which text is to be used instead of portions of the MC text. Handwritten notes to the EDITSPEC operator are prepared defining the required replacements. In the example, the paragraph titled "APPLICABLE PUBLICATIONS" is to be replaced by the text of document 87GS07510.00. Unique text is written to cover items not covered by the MC or RM documents. Each segment of unique text is marked as to its final location in the MC. The EDITSPEC operator is given the completed checklist, the replacement instructions, and the unique text. The operator enters the completed checklist and issues the "GENERATE" command, which causes the system to generate a new RS and add commands to copy the required MC text to the RS. These commands are performed only when a print request is given. The operator edits the project section and inserts the replacement request and the unique text. Following a logic check command, the system checks the text to ensure that it is logically correct, complete, and does not include extraneous material.

CONCEPT DESIGN EXAMPLE

Design Criteria:
Location: Lone Star AAP, Texarkana, Texas
Building No. 1: 40' x 60' roof area
Average roof slope of 1/4 inch per foot
Precast gypsum roof deck
Cants and wood walkways required
Parapet walls and gravel stops not required

FINAL DESIGN EXAMPLE

Design Criteria: The following buildings have been added to the project:
Building No. 2: 60' x 90' roof area
    Average roof slope of 1 inch per foot
    Steel deck with fiberboard insulation
    Parapet walls, valleys and gravel stops required
Building No. 3: 60' x 90' roof area
    Average roof slope of 2 inches per foot
    Precast concrete roof deck
    Parapet walls, valleys and gravel stops required
    Composition traffic surface

FIGURE 1. CONCEPT AND FINAL DESIGN EXAMPLE

Updating

Updating may be caused by a redesign, a more detailed design, and/or MC changes. The process begins by reviewing the previous checklist and preparing an updated checklist. The unique text and references are reviewed and corrected if necessary. All materials are given to the operator, who enters the changes to the checklist and issues the "UPDATE" command. The system then obtains the latest copy of the MC, the current updated checklist, and the outdated RS. The RS is rewritten to comply with the updated items automatically. The operator edits the RS, changing the replacement requests and unique text as required. A logic check command is issued to ensure the completeness. An example of an updated design is shown in Figure 1. The updated checklist is shown in the "final" column of Figure 2. When all RS sections are complete and the RS is ready for printing, the operator issues the print project command (PPRO). The system will automatically obtain the latest references and latest MC text, automatically paragraph and paginate correctly, and print the complete RS.

EDITSPEC SYSTEM OPERATION

EDITSPEC has been designed to operate in three different phases.

Phase I - Editor

Operating in this phase, EDITSPEC functions as a very sophisticated text editor. EDITSPEC is applied to add, change, and delete unique text in RS. The RS writer manually creates commands to copy text from the MC and place the text into the RS. The RS is manually edited to add unique text. The RS is then formatted and printed.

Phase 2 - Automatic Generation and Update

Operating in this phase, the system functions as a creator of a RS. The MC writer has previously informed EDITSPEC when each segment of text should be pulled from the MC and placed into a RS. This information is known as a pull command. The MC writer has previously prepared a list of items covered by the MC. The RS writer uses this item list to indicate the items that exist in the actual RS. EDITSPEC takes the actual items present and automatically evaluates the pull commands to automatically produce copy commands for the RS writer. Thus, freeing the RS writer from performing these functions. The editor, phase 1, can be applied to add unique text to the automatically produced reduced scope documents.

Phase 3 - Computer-Aided Design System (CADS)

EDITSPEC has been designated for future integration into a CADS system when such a system is developed. The writer would apply the CADS system to perform the RS design. The actual RS related design information would be stored in the computer. The RS writer would request EDITSPEC to generate a RS. EDITSPEC would automatically obtain the stored RS design information and automatically evaluate the item checklist. Thus, freeing the RS writer from performing these activities.

C = Concept Design Condition Number			F = Final Design Design Conditions
1	C	F	Control Condition (Required)
			Built-up roofing substrate:
2	X		Mineral-fiber, expanded perlite or fiberboard insulation
4	X	X	Cast-in-place concrete
5	X		Precast concrete
6			Precast gypsum
7	X	X	Cast-in-place gypsum
8	X	X	Lightweight insulating concrete
			Roof Slopes:
9	X		All slopes 1/2 inch per foot or less
10	X	X	All slopes greater than 1/2 inch to 1 inch per foot
11	X	X	All slopes greater than 1 inch to 3 inch per foot
12	X		Combination of slopes including slopes 1/2 inch per foot or less
13	X	X	Combination of slopes, all greater than 1/2" per foot
			Average January temperature:
14			40°F and above
15	X	X	Below 40°F
16	X		Gravel stops required
17	X		Valleys required
18			Cants required
19			Wood walkways required
20	X		Composition traffic surfaces required
21			Vertical surfaces abut sloped roof surfaces
22	X		Bitumen samples required
23	X	X	Light-colored aggregate is available and work is in Air Force weather condition zones A or B
			Air Force weather condition zones A or B
24			Army or Air Force construction is not in the vicinity of warmup/operating aprons. For work that is not in the vicinity of warmup/operating aprons, the roof substrates and slopes are as follows:
25	X	X	Concrete or insulation - all slopes 1/2 inch per foot or less
26	X	X	Cast-in-place concrete - slopes greater than 1/2 inch per ft
27	X		Precast concrete - slopes greater than 1/2 inch per ft
28	X		Expanded perlite, fiberboard or mineral fiber insulation -
29	X	X	slopes greater than 1/2 inch per ft
30			Gypsum or insulating concrete - all slopes 1/2 inch per ft or less
31	X	X	Gypsum or insulating concrete - slopes greater than 1/2 inch per ft
32	X	X	Air Force construction is in the vicinity of AF warmup/operating aprons
			For work in the vicinity of AF warmup/operating aprons, roof substrates and slopes will be as follows:
33	X	X	Concrete or insulation - all slopes 1/2 inch per ft or less
34	X	X	Cast-in-place concrete - slopes greater than 1/2 inch per ft
35	X	X	Precast concrete - slopes greater than 1/2 inch per ft
36	X	X	Expanded perlite, fiberboard or mineral fiber insulation - slopes greater than 1/2 inch per ft
37	X	X	Composite board, cellular glass, isocyanurate or urethane insulation - slopes greater than 1/2 inch per ft
38	X	X	Gypsum or insulating concrete - all slopes 1/2 inch per ft or less
39	X	X	Gypsum or insulating concrete - slopes greater than 1/2 inch per ft

FIGURE 2. CHECKLIST--CEGS-07510--BUILT-UP ROOFING

CLEANING UP OUR GI MANUALS IN THE SPIRIT OF THE 80'S

Lynne C. Meyer
Pratt & Whitney Aircraft, Government Products Division

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(203) 344–4413

1981 ITCC Outstanding
Poster Award Winner

U.S. military jet engines built around 1950 will still be in service until the year 2000. Meanwhile, part efficiency and safety need to be maintained, and well written manuals are an important asset to the job.

In recognizing the need for improved technical communication, P&WA technical writers are redesigning manuals for GIs who have little or no previous training or experience.

A comparison of former and present layouts of an engine cleaning manual will demonstrate our effort to reduce user error and minimize part damage or loss.

INTRODUCTION

Simplifying the cleaning manuals is the result of a massive reformatting of manuals undertaken by P&WA technical writers in cooperation with the Air Force and Navy.

Basically, information pertaining to the maintenance of the J57 engine is divided into twelve volumes or technical orders such as rework and reidentification, assembly, disassembly, cleaning, inspection, repair, test, etc. A volume, in turn, is subdivided into work packages, each of which supplies all the instructions necessary to perform a specific task. Included in a work package is an updated list of model effectivity; reference materials, expendables, consumables, tools required; and, a step–by–step outline of instructions with accompanying figures and tables.

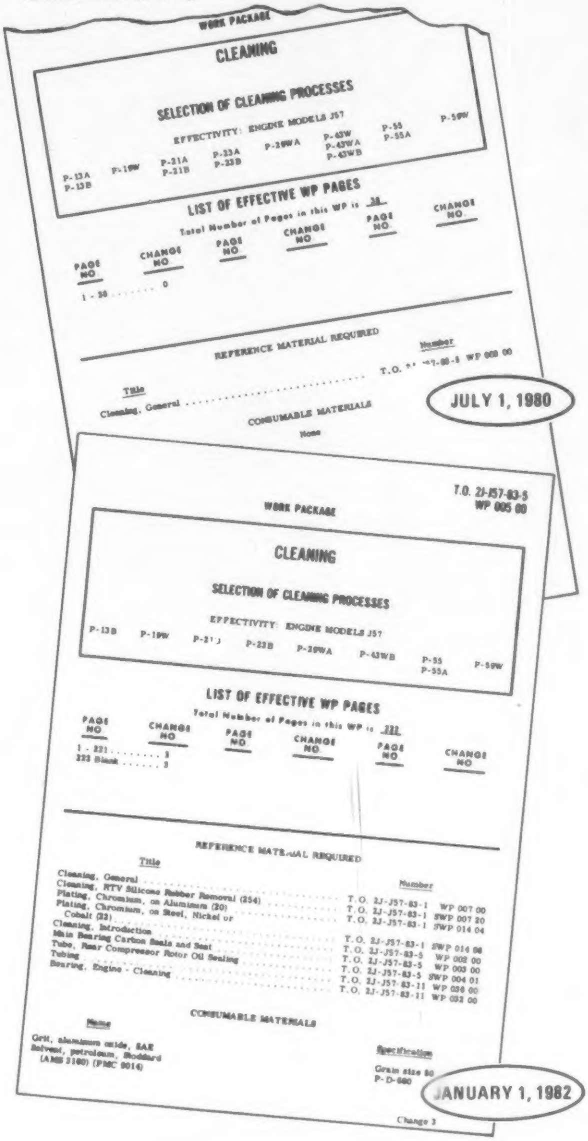
THE USER

Recent studies have shown that the typical GI who uses these manuals is approximately 18 to 20 years old, with a four year military commitment, 8th grade reading level, and little or no previous job experience.

Consequently, we were faced with the challenge of drastically revising our manuals, some of which, like troubleshooting and test, had been written on a grade 17 reading level for servicemen with engineering degrees and a lifetime military commitment. In the process of rewriting for today's GI, clearer, more concise, less intimidating, and more appealing manuals evolved based on the work package concept.

THE WORK PACKAGE: OLD VS. NEW

General information in Volume I tells us that cleaning is contained in Volume 5. A dramatic change occurred between July 1, 1980 and January 1, 1982. The number of pages increased from 38 to 222, the list of reference materials required is now extensive and specific, and consumable materials have been added. (See figure 1.)



WORK PACKAGE

CLEANING

SELECTION OF CLEANING PROCESSES

EFFECTIVITY: ENGINE MODELS J57

P-13A P-13B · P-19W · P-21A P-21B · P-23A P-23B · P-29WA · P-43W P-43WA P-43WB · P-55 P-55A · P-59W

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 38

PAGE NO	CHANGE NO	PAGE NO	CHANGE NO	PAGE NO	CHANGE NO
1 - 38	0				

REFERENCE MATERIAL REQUIRED

Title	Number
Cleaning, General	T.O. [illegible]-83-5 WP 000 00

CONSUMABLE MATERIALS

None

JULY 1, 1980

T.O. 2J-J57-83-5
WP 005 00

WORK PACKAGE

CLEANING

SELECTION OF CLEANING PROCESSES

EFFECTIVITY: ENGINE MODELS J57

P-13B · P-19W · P-21B · P-23B · P-29WA · P-43WB · P-55 P-55A · P-59W

LIST OF EFFECTIVE WP PAGES

Total Number of Pages in this WP is 222

PAGE NO	CHANGE NO	PAGE NO	CHANGE NO	PAGE NO	CHANGE NO
1 - 221	3				
222 Blank	3				

REFERENCE MATERIAL REQUIRED

Title	Number
Cleaning, General	T.O. 2J-J57-83-1 WP 007 00
Cleaning, RTV Silicone Rubber Removal (254)	T.O. 2J-J57-83-1 SWP 007 20
Plating, Chromium, on Aluminum (20)	T.O. 2J-J57-83-1 SWP 014 04
Plating, Chromium, on Steel, Nickel or Cobalt (22)	T.O. 2J-J57-83-1 SWP 014 06
Cleaning, Introduction	T.O. 2J-J57-83-5 WP 002 00
Main Bearing Carbon Seals and Seat	T.O. 2J-J57-83-5 WP 003 00
Tube, Rear Compressor Rotor Oil Sealing	T.O. 2J-J57-83-5 SWP 004 01
Tubing	T.O. 2J-J57-83-11 WP 036 00
Bearing, Engine - Cleaning	T.O. 2J-J57-83-11 WP 032 00

CONSUMABLE MATERIALS

Name	Specification
Grit, aluminum oxide, SAE	Grain size 80
Solvent, petroleum, Stoddard (AMS 3160) (PMC 9014)	P-D-680

JANUARY 1, 1982

Change 3

Figure 1. Growth of Reference and Consumable Materials Lists

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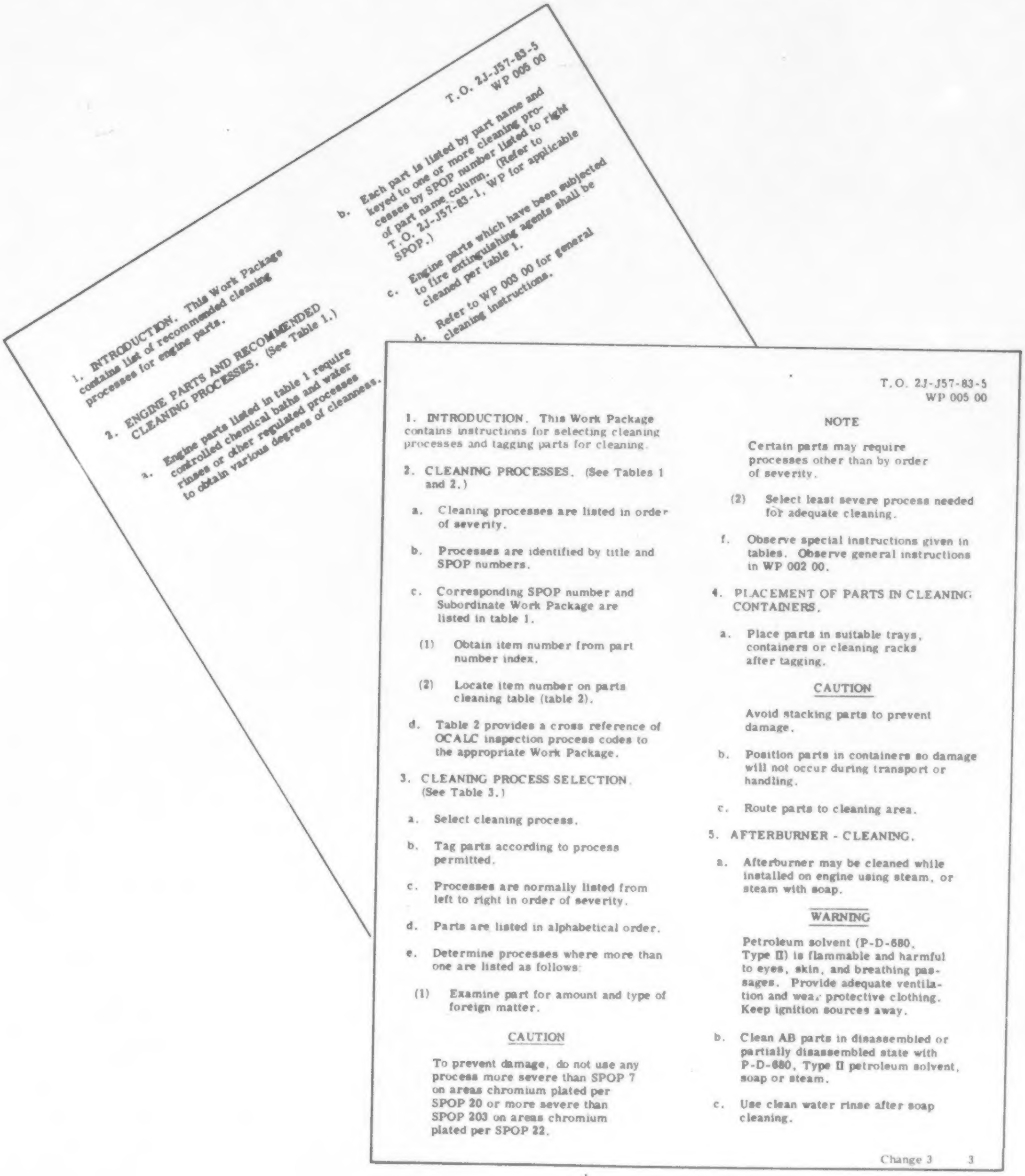
The two outlines offer quite a contrast to one another. (See figure 2.)

The Basic Outline:

- Two vague paragraph headings
- Non–specific statements
- No notes, cautions, or warnings
- Only one table referenced
- Insufficient information
- 9.3 RGL (Reading Grade Level, although outline is too brief for this RGL to be significant)

The Current Outline:

- Five more specific headings
- Detailed information
- One note, two cautions, and one warning
- Clear instructions on:
  - — How to locate cleaning information
  - — How processes are listed by order of severity
  - — How to tag parts
  - — How to examine parts
  - — How to place parts in containers
  - — How to clean the afterburner
- Four tables referenced
- 8.7 RGL (Reading Grade Level)



T.O. 2J-J57-83-5
WP 005 00

1. INTRODUCTION. This Work Package contains list of recommended cleaning processes for engine parts.

2. ENGINE PARTS AND RECOMMENDED CLEANING PROCESSES. (See Table 1.)

a. Engine parts listed in table 1 require controlled chemical baths and water rinses or other regulated processes to obtain various degrees of cleanness.

b. Each part is listed by part name and keyed to one or more cleaning processes by SPOP number listed to right of part name column. (Refer to T.O. 2J-J57-83-1, WP for applicable SPOP.)

c. Engine parts which have been subjected to fire extinguishing agents shall be cleaned per table 1.

d. Refer to WP 003 00 for general cleaning instructions.

T.O. 2J-J57-83-5
WP 005 00

1. INTRODUCTION. This Work Package contains instructions for selecting cleaning processes and tagging parts for cleaning.

2. CLEANING PROCESSES. (See Tables 1 and 2.)

a. Cleaning processes are listed in order of severity.

b. Processes are identified by title and SPOP numbers.

c. Corresponding SPOP number and Subordinate Work Package are listed in table 1.

(1) Obtain item number from part number index.

(2) Locate item number on parts cleaning table (table 2).

d. Table 2 provides a cross reference of OCALC inspection process codes to the appropriate Work Package.

3. CLEANING PROCESS SELECTION. (See Table 3.)

a. Select cleaning process.

b. Tag parts according to process permitted.

c. Processes are normally listed from left to right in order of severity.

d. Parts are listed in alphabetical order.

e. Determine processes where more than one are listed as follows:

(1) Examine part for amount and type of foreign matter.

CAUTION

To prevent damage, do not use any process more severe than SPOP 7 on areas chromium plated per SPOP 20 or more severe than SPOP 203 on areas chromium plated per SPOP 22.

NOTE

Certain parts may require processes other than by order of severity.

(2) Select least severe process needed for adequate cleaning.

f. Observe special instructions given in tables. Observe general instructions in WP 002 00.

4. PLACEMENT OF PARTS IN CLEANING CONTAINERS.

a. Place parts in suitable trays, containers or cleaning racks after tagging.

CAUTION

Avoid stacking parts to prevent damage.

b. Position parts in containers so damage will not occur during transport or handling.

c. Route parts to cleaning area.

5. AFTERBURNER - CLEANING.

a. Afterburner may be cleaned while installed on engine using steam, or steam with soap.

WARNING

Petroleum solvent (P-D-680, Type II) is flammable and harmful to eyes, skin, and breathing passages. Provide adequate ventilation and wear protective clothing. Keep ignition sources away.

b. Clean AB parts in disassembled or partially disassembled state with P-D-680, Type II petroleum solvent, soap or steam.

c. Use clean water rinse after soap cleaning.

Change 3 3

Figure 2. A Comparison Between Basic and Current Outlines

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The beauty of the new format lies in better use of tabular information. Unlike the basic work package, the new format provides a list of cleaning processes by title, SPOP (Service Process Operation Procedure) number, and subordinate work packages in Volume I that describe the process in detail. (See figure 3.)

The new format is also unique in listing inspection processes used after cleaning procedures. They are listed by OCALC (Oklahoma City Air Logistics Center) code, type of process, and the Volume I work package references.

- Easy–to–read, specific instructions
- Suitable presentation for military personnel with minimal training and experience, with a short term job commitment, and poor reading skills
- Notes, cautions, warnings, and special instructions where necessary
- 3D illustrations to help identify parts
- Fool–proof method for quickly locating cleaning processes
- Alphabetical listing of parts
- Material specifications

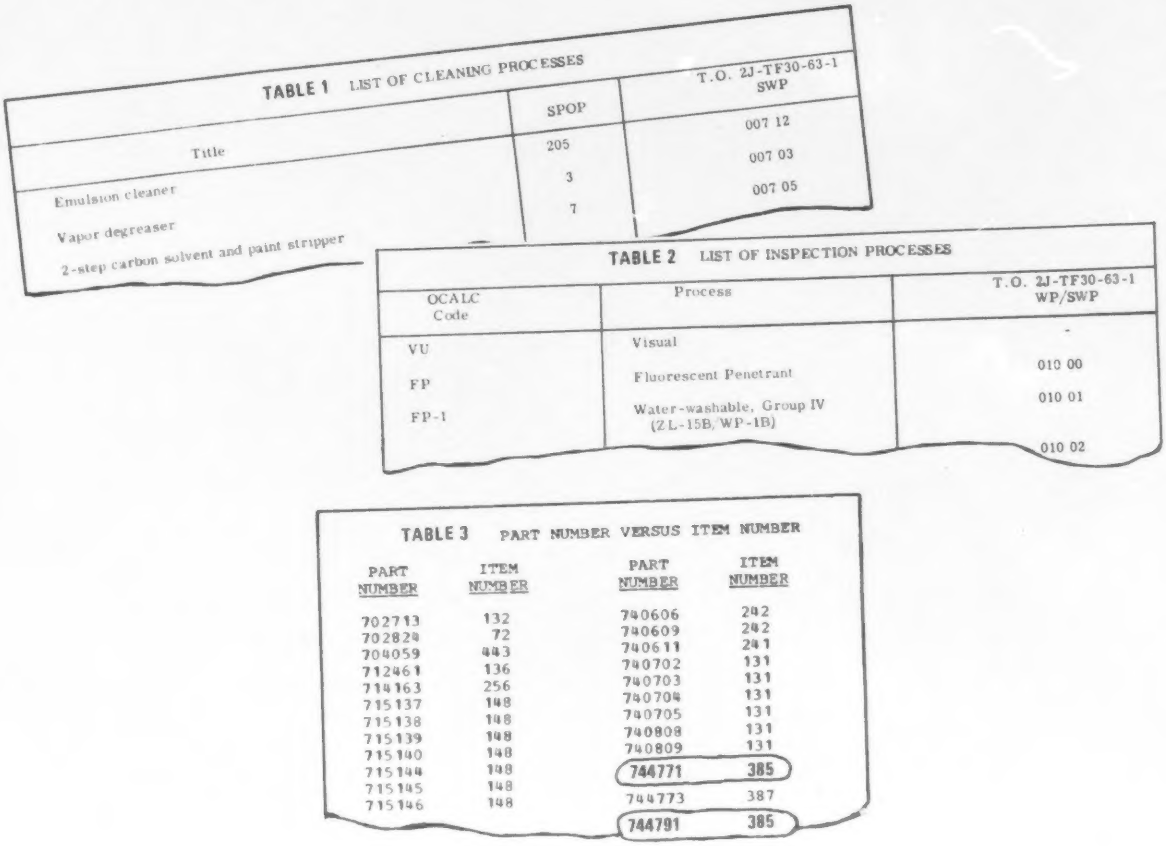


TABLE 1 LIST OF CLEANING PROCESSES

Title	SPOP	T.O. 2J-TF30-63-1 SWP
Emulsion cleaner	205	007 12
Vapor degreaser	3	007 03
2-step carbon solvent and paint stripper	7	007 05

TABLE 2 LIST OF INSPECTION PROCESSES

OCALC Code	Process	T.O. 2J-TF30-63-1 WP/SWP
VU	Visual	-
FP	Fluorescent Penetrant	010 00
FP-1	Water-washable, Group IV (ZL-15B, WP-1B)	010 01
		010 02

TABLE 3 PART NUMBER VERSUS ITEM NUMBER

PART NUMBER	ITEM NUMBER	PART NUMBER	ITEM NUMBER
702713	132	740606	242
702824	72	740609	242
704059	443	740611	241
712461	136	740702	131
714163	256	740703	131
715137	148	740704	131
715138	148	740705	131
715139	148	740808	131
715140	148	740809	131
715144	148	744771	385
715145	148	744773	387
715146	148	744791	385

Figure 3. New Tables in the Current Work Package

Additionally, the new format introduces a means whereby a person can quickly locate the desired cleaning information for a given part without having to know the official name of the part. Terms used in the shop like "clamshell," "watermelon," and "dogbone" will never be found on a list of official blueprint names. Thus, Table 3 was devised to enable one to find the item number by locating the part number stamped on each part.

The new format is a vast improvement over the basic work package format, which in turn was a vast improvement over the prework package format which did not even list part numbers. (See figure 4.)

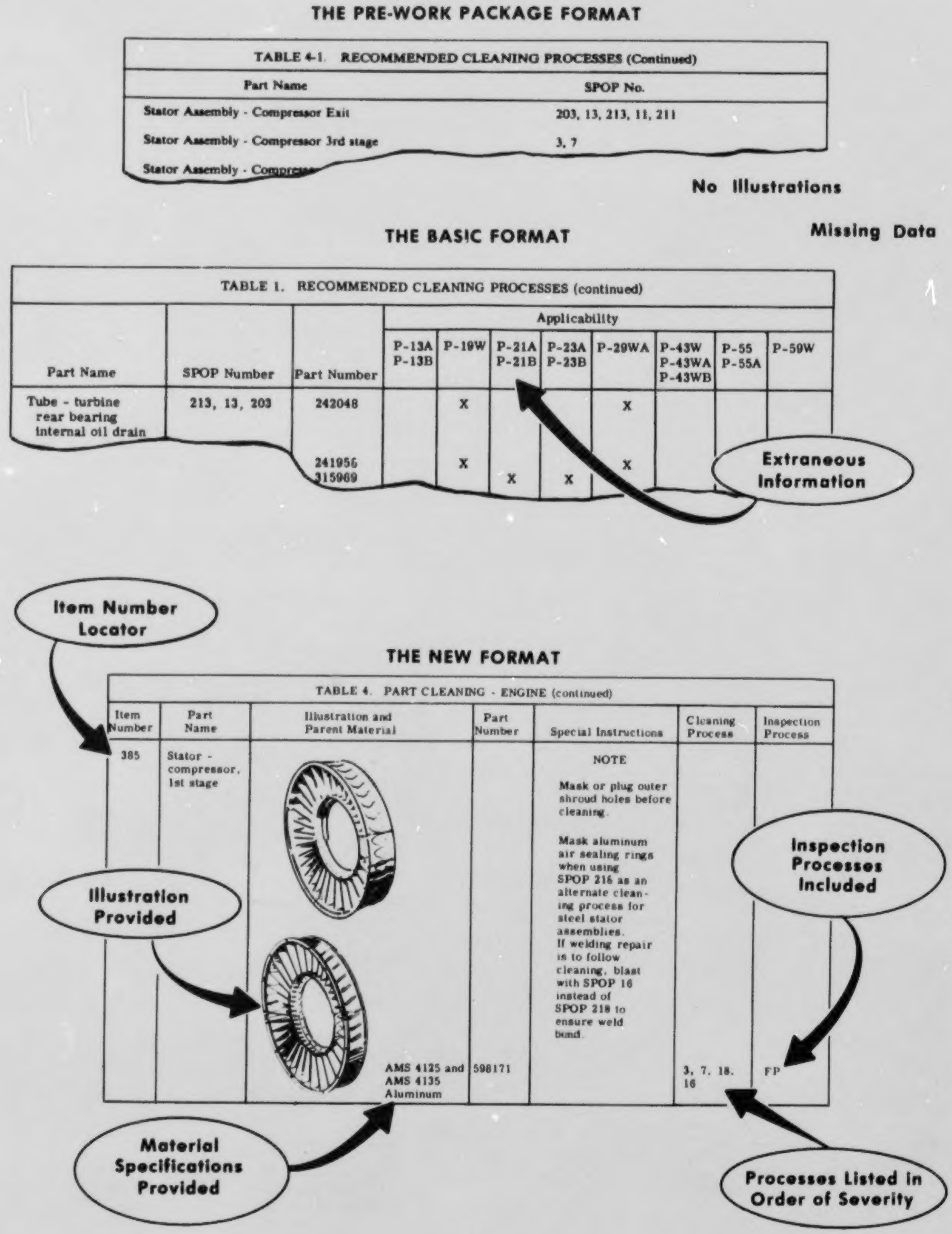
SUMMARY

Even though we intend to continue making our manual even more usable, we feel the latest manual provides:

- General and specific cleaning information with processes listed in order of severity
- General and specific inspection information

As a result, it is hoped that the following is produced:

- Reduction of error
- Rapid location of information
- Decrease in part loss
- Cost reduction
- Safer, more reliable, longer lasting product
- Satisfied customer
- Better use of tax dollars
- Confidence in American military strength



THE PRE-WORK PACKAGE FORMAT

TABLE 4-1. RECOMMENDED CLEANING PROCESSES (Continued)

Part Name	SPOP No.
Stator Assembly - Compressor Exit	203, 13, 213, 11, 211
Stator Assembly - Compressor 3rd stage	3, 7
Stator Assembly - Compress	

THE BASIC FORMAT

TABLE 1. RECOMMENDED CLEANING PROCESSES (continued)

Part Name	SPOP Number	Part Number	Applicability							
			P-13A P-13B	P-19W	P-21A P-21B	P-23A P-23B	P-29WA	P-43W P-43WA P-43WB	P-55 P-55A	P-59W
Tube - turbine rear bearing internal oil drain	213, 13, 203	242048		X			X			
		241956		X			X			
		315969			X	X				

THE NEW FORMAT

TABLE 4. PART CLEANING - ENGINE (continued)

Item Number	Part Name	Illustration and Parent Material	Part Number	Special Instructions	Cleaning Process	Inspection Process
385	Stator - compressor, 1st stage	AMS 4125 and AMS 4135 Aluminum	598171	NOTE Mask or plug outer shroud holes before cleaning. Mask aluminum air sealing rings when using SPOP 216 as an alternate cleaning process for steel stator assemblies. If welding repair is to follow cleaning, blast with SPOP 16 instead of SPOP 218 to ensure weld bond.	3, 7, 18, 16	FP

No Illustrations
Missing Data
Extraneous Information
Item Number Locator
Illustration Provided
Inspection Processes Included
Material Specifications Provided
Processes Listed in Order of Severity

Figure 4. Historical Overview of the J57 Cleaning Manual Format

CONQUERING COMPLEXITY

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Technical Editor
3 Years

Production of many documents under tight time and budget constraints by many authors and three (or more) different editors for the same client need not be a nightmare of inconsistency and duplicated effort. Such a production task was faced by Environmental Science and Engineering, Inc. (ESE), an approximately 300-person environmental consulting firm, under contract to the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA).

Effective communication during this complex, multi-author, multi-editor project has resulted in client satisfaction without undue stress on the editors. Some steps for achieving such communication include use of a project guide booklet, an efficient information logging and referencing procedure, effective communication concerning a client-specified format, a consistent review procedure, close communication with all document production departments, and constant exchange between all editors involved in the project. Each document requires individual adaptations of any such suggestions, of course, but the general principles can ease the work of an editor involved in complex government-funded projects.

INTRODUCTION

Production of many documents under tight time and budget constraints by many authors and three (or more) different editors for the same client need not be a nightmare of inconsistency and duplicated effort. Such a production task was faced by Environmental Science and Engineering, Inc. (ESE), an approximately 300-person environmental consulting firm, under contract to the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA). The initial contract involved producing two reports per month, each involving an onsite visit to a government site by a team consisting of a team leader, chemist, ecologist, engineer, geologist, and historian/document coordinator/editor, all of whom participated as authors. Since that time, the project has grown to include three teams of six members each, overlapping schedules for production, three different editors (one per team), and continued satisfaction from the client with regard to technical and editorial content.

To achieve the continued high quality has, of course, involved communication between all project members, which can include up to approximately 15 persons per report before the document is ready for shipment to the client. Looking beyond general "communication," several specific steps have been taken to allow this mammoth task to be successfully completed on budget and, for the most part, on schedule.

PRODUCTION METHODS

Organizing the Project

The basic structure of this project requires that each team member review literature provided by the government, particularly that involving pertinent regulations and studies, and information directly related to the site which is to be visited. While onsite, team members conduct interviews and search government files regarding the particular area being researched. To ensure that members of each of the three teams are gathering similar types of information, a comprehensive booklet entitled "Onsite Guide to Conducting USATHAMA Initial Installation Assessments" was prepared by one of ESE's team leaders. This booklet describes the report outline, which is identical for every report, the type of information required to write the report, whom to ask for the information while onsite, and the particular slant which the client desires.

Development of a Publications List

To deal with the number of documents (frequently over 200) related to each site visited, a system was devised for logging every document, map, pamphlet, etc. relating to a particular site. Each piece of material is assigned a letter designation, according to the applicable site name, and a number and categorized according to content and origin of the material. For instance, the fifteenth document relating to John Doe Site would be logged as JDS-15, labeled "HIST" if it contained information on the history of the site, and numbered 1 if provided by the U.S. Geological Survey. This designation is written on the piece of material, which is placed in a central file for the site. The librarian compiles a list of all items for each site, listing beside an entry such as JDS-15 its complete bibliographic reference. This "pubs" list is then distributed to all team members (see Figure 1). When writing his/her section of the report, an author needs only to locate a particular reference on the pubs list and insert the letter-number designation in the text. The purpose for the pubs list is threefold:

1. The list serves as a checkout method for the librarian and team members and enables team members to quickly locate which items pertain to their subject area.
2. The librarian, who is responsible for returning all materials to the government when the project is completed, has a list of all publications. By checking through the files of sequentially numbered materials, he/she can quickly identify which items are missing and retrieve them.
3. The editors do not have to contend with incomplete references from the authors and track down the author and/or incompletely referenced document. Before the document is sent to the client, the pubs list letter-number designation is deleted from the text, and the editor inserts in the text the author, year reference format (i.e., Brown, 1982) preferred by the client.

JOHN DOE SITE (JDS) PUBLICATIONS LIST

Pubs List Code	Bibliographic Reference	Subject Code/Origin*
JDS-1	State of Florida. Department of Environmental Regulation. 1982. Florida's Endangered Species. Tallahassee, Fla.	BIO/1
JDS-2	The Field Artillery School, Station Hospital. 1927. Annual Sanitary Report. John Doe Site.	GEN, GEO, AIR, LWT/5
JDS-3	U.S. Army. Office of the Adjutant General. 1926. Report of Storage for War Reserve Material. Washington, D.C.	ORDNANCE/4
JDS-4	Acreage of John Doe Site, 1915.	HIST/2
JDS-5	Anonymous. n.d. Histories of Army Posts. Reprinted from the Recruiting News.	HIST/2

* Origin
1 = U.S. Geological Survey.
2 = John Doe Site.
3 = U.S. Soil Conservation Service.
4 = National Archives.
5 = U.S. Army Environmental Hygiene Agency.

Figure 1. Sample Publications List for a Specific Site

Besides the pubs list compiled specifically for each site visited, the librarian compiled one General Publications List at the beginning of the project and updates it as necessary. This list includes government, U.S. Environmental Protection Agency (EPA), and other federal regulations which are used in nearly every document. Use of these references (which appear as GEN-1, GEN-2, etc.) results in the same benefits as the specific site pubs list for the librarian, authors, and editors.

Use of Client-Specified Format

Because ESE's Word Processing Center (WPC) has five Lanier Text Editors (LTEs) and as many WPC operators and because a night shift in the WPC works when the editors are not available for format questions, a concise 3-page Format Guide was developed and is included in every folder submitted to the WPC. Such a guide becomes an absolute necessity for documents like these government reports, which do not conform to ESE format specifications, as the WPC operators are instructed to use ESE format unless notified otherwise. Due to the use of special acronyms, abbreviations, spellings, and capitalizations required by the government, costs are kept to a minimum in the WPC by providing correct, up-to-date, concise information to WPC operators.

An obvious advantage of using a word processing system for production of such a large number of documents with the same basic table of contents and format is the ability to use boilerplate material that can be duplicated from one floppy disk to another and modified as required without unnecessary rekeyboarding. Floppy disks, like the specific pubs lists, are named for a specific site, and only materials relating to that site are included on the disk. Text which can be duplicated includes the cover, disclaimer, table of contents, and introductory materials. Although this does not amount to a large number of pages as compared to the total document, duplication ensures consistency for all documents.

One client-specified requirement developed during the project is compilation of an acronyms list for each report (see Figure 2). After its first use in the document, an acronym is spelled out, abbreviated, and thereafter the acronym alone is used. Because of the large number of acronyms in each report and a lack of universal usage of many acronyms (some are specific to a particular site), the acronyms list was suggested as an aid to the reader. It was not feasible to duplicate the lists because they vary between sites. To eliminate duplication of effort for the three editors, a central file is maintained of 3- by 5-inch cards with one acronym and definition per card. It then becomes a simple matter for each editor to go through a document, determine which acronyms are used, and pull out the necessary cards, creating new cards when required. Essential to the success of this card system is that each editor must replace the cards in the central file after the WPC has typed the acronyms list.

AF	airfield
Ag	silver
AG	Adjutant General
AMEDD PERS	Army Medical Department Personnel
AQCR	Air Quality Control Region
ARMR I	U.S. Army Readiness and Mobilization Unit I
ARRCOM	U.S. Army Armament Materiel Readiness Command
ARTEP	Army Training and Evaluation Program
AV	aviation
BOD	biochemical oxygen demand
BTU	British thermal units
°C	degrees Celsius
$CaCO_3$	calcium carbonate
cal	caliber
CBT	combat
CECOM	U.S. Army Communications and Electronics Command

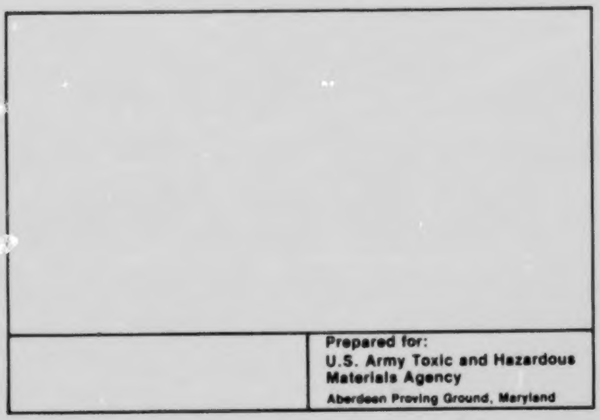
Figure 2. Sample List of Acronyms

Editorial Review

With regard to review for editorial content and consistency, one reviewer is used for reports produced by each of the three teams. Having one final reviewer provides a double check for the editors. If the reviewer notices an editorial or format change which has not appeared in any of the previous reports, he/she can talk with the editor to ensure that adequate communication is occurring among the editors and that one editor has not allowed a personal preference to interfere with consistency or that perhaps one editor has received new editorial/consistency information and has yet to pass it along to the other two editors.

Tips for Achieving Consistency

Other practices which have minimized costs and helped maintain the quality of the reports include communication among the editors and with the Graphics Department and the Copy Center. To achieve consistency and keep down graphics costs, the same format page is used for all graphics (see Figure 3). This eliminates the cost of producing a different format page for each site. The format box lists the general name of the project, and the name of the site is included in the title of the graphic (i.e., Soils Map for John Doe Site) to ensure that a graphic pertaining to one site is not inadvertently used for another site. Because the same general types of graphics are used in each report (i.e., soils map, site map, location map, surface drainage map), a graphics checklist was developed which can be used for each site to ensure that no crucial graphic is omitted in the rush to make the deadline (see Figure 4). This checklist includes adequate space to add names of graphics which may be used for one site only. Column headings across the top of the checklist allow the editor and graphics personnel to keep track of the status of the graphic. Such column headings include: (1) responsible team member; (2) date rough submitted; (3) date of first, second, review; (4) need for slides; and (5) any special instructions.



Prepared for:
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

Figure 3. Sample Format Page for Graphics

Communication with Copy Center personnel (who operate a Xerox 9500 to reproduce client copies) has resulted in efficient, extremely fast production of copies. The editors determined that all draft copies of a document would have a green cover and black GBC binding strips, and all final document copies would have a sand-colored cover and brown GBC binding strips. A few other client requirements differ with the ESE format for xeroxing documents, but by deciding on one standard for all government documents and providing that information to Copy Center personnel, the documents are reproduced cost effectively and correctly.

Site: ____________ Team Leader: ____________
Project No.: ____________ Document Coordinator: ____________

Description	Responsible Team Member	Rough Received	First Draft	First Draft Revised	Final	Slides Yes	Slides No	Slides Completed
1. Site Map (Installation)								
2. Site Map (Cantonment Area)								
3. Location Map								
4. Organizational Chart								
5. Surface Drainage								
6. Soils								
7. Engineering Geology								
8. Geologic Cross Section								
9. Vegetative Cover								
10. Ranges								

Figure 4. Sample Graphics Checklist

A final means of producing consistent, high quality documents for this complex project is less concrete, but as important as any of the other methods used. The three editors must continually keep one another informed of format changes (which occur frequently). This communication is achieved, for example, by noting any format changes indicated on a report after it has been reviewed by the government between the draft and final documents and bringing such changes to the attention of the other editors. If the government review comments directly contradict editorial/format information provided to the editors previously, the USATHAMA editor may be called for verification. However, the three editors at ESE always discuss questions needed to be asked before contacting the government editor. Often these sessions, lasting only a few minutes, help ensure that the ESE editors are interpreting government format guidelines in the same manner. Discussion among the ESE editors can sometimes eliminate the need for calling the USATHAMA editor. A commitment by all three editors to communicating among themselves and appropriate team members any new information received concerning the government documents has helped maintain high quality reports.

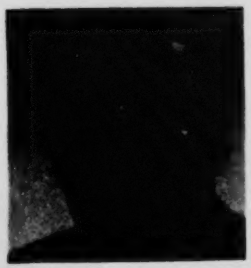
SUMMARY

Effective communication during a complex, multi-author, multi-editor project can result in client satisfaction without undue stress on the editors. Some steps for achieving such communication include use of a project guide booklet, an efficient information logging and referencing procedure, effective communication concerning a client-specified format, a consistent review procedure, close communication with all document production departments, and constant exchange between all editors involved in the project. Each document requires individual adaptations of any such suggestions, of course, but the general principles can ease the work of an editor involved in complex government-funded projects.

"Improving the Attitude of Professionals to Writing"

H. Lee Shimberg

Consultant, Technical Writing and Editing



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Lee Shimberg was Chief of the Publications Group at the Naval Ordnance Laboratory until 1972. He has been teaching writing and editing for the USDA Graduate School since 1975 and has written three Course Guides for the Correspondence Division. Mr. Shimberg was a cofounder of STC's Washington Chapter in 1954. His numerous STC posts include Chapter Chairman, Program Chairman of the 16th ITCC, and President of STC (1977-78). He was elected a Fellow of STC in 1970.

Most professionals who write reports as an incidental but required part of their duties approach the task with something less than unbounded enthusiasm. This chary attitude is attributable in part to the undeniable fact that these professionals would rather be pursuing their primary duties whether these be concerned with medicine, law, scientific research, or engineering.

The major reason for their tentative attitude is that they feel inadequately trained in writing skills compared with their training in their professional skills. The difficulties they experience most often have been described as "getting started (writer's block)," "organizing effectively," and "reviewing and revising for readability as well as content." These problems and some remedies I suggest to these people are discussed briefly.

SUCCESSFUL STRATEGIES FOR THE ENGINEERING WRITER

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ABSTRACT

The basic requirements for an engineering paper or report are logical organization, clear expression, and empathy for readers. Just as important for the success of the document, however, are the author's selection of strategies. Some of the conscious decisions an author must make at various stages of writing and publishing include a structural plan based on the needs of future readers, the choice of methods for strengthening the manuscript, the best selection of topics for graphic illustration, an early decision on a publication vechicle, tactics for defense against technical criticism, and the choice of ways to avoid writing problems before they arise.

A beautifully written, logically organized, clearly phrased document on a current topic can be a disappointing failure unless the author understands and uses the *strategies* of the writing and publishing processes.

"Authors' Strategies for Marketing Their Books"

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Besides being an editor, Eva Dukes is Editorial Representative for the *RCA Engineer* at RCA Labs. Her acquisitions work includes medical books for Marcel Dekker Inc. (1974-75) and encyclopedia articles in chemistry, nutrition, and food science for Wiley-Interscience (1962-71). At GAF Corp. she was a technical writer (1946-51). Ms Dukes is a member of the American Chemical Society and American Medical Writers' Association. She has been active in STC since the '50s and was President of the N.Y. Chapter in 1978. She has written many professional articles, especially for STC's *New York Chapter Notes* and *Technical Communication*.

Engineering and other technical or scientific authors writing for their peers or for students do not have agents, as do most writers of trade books. It is up to these authors to get a contract for a book or a series on the most advantageous terms that can be obtained.

To do this successfully, authors must make sure their material is fresh and noteworthy. They must also know in which areas certain publishers specialize, whether the production, promotion, and distribution efforts of these publishers are likely to be satisfactory, and how best to approach the right publisher. Some familiarity with standard contracts is desirable.

Experienced colleagues can be very helpful by providing guidance in these areas, but they are not the author's only available source of information. Peer feedback and consultation with the publisher are also important resources in the initial stages of designing a book or book series and, later, in evaluating the manuscript. In planning a textbook, the author would do well to study the requirements of individual states and even schools. This can pave the way for wide acceptance.

ROLE PLAYING A WRITER/EDITOR CONFERENCE: DEMONSTRATING THE IMPORTANCE OF GOOD INTERPERSONAL SKILLS

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How can collaboration improve the editing process to produce a better product?

In our research for this workshop four of us examined in detail some of the common problems that hinder writers, copy editors, and supervisory editors from collaborating as effectively as possible. Although these barriers can result from the organizational structure of the company, plant layout, or differing levels of technical training, many arise from poor interpersonal skills; however, little work has been done inside many corporations to improve these skills. We look at concrete ways to improve collaborative efforts between all those involved in the editing process; such interpersonal skills as balanced negative and positive comments, skilled listening and questioning, deliberate lowering of status, and early collaboration significantly improve the process and the product. We drew on information obtained from more than 16 in-depth interviews with writers and editors employed in different industrial settings including computer firms, insurance companies, engineering firms, and commercial publishing houses.

We will role play a conference between a writer and editor to dramatize the obstacles that impede the communication process. After this initial role-playing session, we plan to have the members of the audience respond to the dramatization in a brainstorming session to uncover additional or similar problems that they have experienced and to identify some possible solutions. A second role-playing session will demonstrate some techniques and approaches that, if employed, will help the writer and editor collaborate more effectively to produce a better product.

People attending this workshop will be given a checklist of practical suggestions including a list of conferencing skills.

GAINING THE RESPECT AND CONFIDENCE OF A TECHNICAL STAFF

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A writer's relationship with his key resources–the technical staff–is an important part of writing a good manual. If there is mutual trust and respect, both parties benefit; otherwise everyone loses, and that includes the company and the audience. Often writers are physically separated from the technical staff, which makes it difficult to form a good relationship. Many technical experts have a low opinion of people with liberal arts backgrounds, and writers who fit that description start out with a mark against them.

Usually problems in the technical resource/writer relationship spring from misunderstanding on both sides. It's up to the writer to demonstrate that he is both technically competent and dependable. What follows are ways in which a writer can develop a good working relationship with the technical staff.

As a technical communicator, you are the link between those who originate or develop ideas and those who use them. Your work directly affects how well ideas are understood. To do your job well, you need the respect and confidence of those who create the ideas: the technical staff.

It can be more difficult to win them over than it is to put the information you have gathered on paper. Technical people are often wary of writers, believing that the information will somehow be lost or misconstrued when it falls into the hands of someone who writes for a living. Some simply don't want to spend any of their time working with a writer; they believe there's nothing in it for them. If getting information is like pulling teeth, you don't have their full cooperation and support.

Your job will be easier if you understand their concerns and make an effort to overcome them. Here are a few tips for improving your relationship with those on the technical staff:

Exhibit confidence in yourself.

The image you project is important. If you are confident of your abilities, some of that confidence will carry over into how other people view you. Show confidence by approaching technical people as equals. Let them know, too, that you acknowledge their skills and respect the work that they do. Your confidence is in your ability to translate the results of their technical work to others. If you treat them with awe or disregard, you will not be accepted.

Tell them your objectives and goals.

If the people you interview know only that you're a writer, they are bound to misunderstand your purpose in being there, and are likely to miss seeing the relationship between your project and theirs. It is your responsibility to tell them what your project means to their work, why they should spend their valuable time with you, and how this contribution to whatever you're writing may benefit them in the long run.

Whenever a relationship is undefined, each party develops his own expectations about it. As a communicator and as the person who is asking for help and cooperation, you need to answer unasked questions and explain what your work has to do with theirs. If someone's expectations, undefined and unknown even to the person holding them, are unmet, you lose credibility. The way to be perceived as technically competent on the job, whatever the field, is to uncover hidden expectations. Use your interviewing skills to open up each person.

Once you know what the technical people expect, you can establish a working relationship that helps them in their own pursuits. A good way to help someone conceptualize your role in this relationship is to make a list of major goals, specific objectives that would help you meet those goals, and ways you could spend your time to accomplish them. Let the technical people study this list. You must be your own manager to appear technically competent to the technical staff.

Show them how your expertise can help them meet their own objectives.

You gain their respect by quickly, quietly, competently meeting the objectives you have set. Give them visible evidence that your work is helping them with theirs. If, for instance, you are working on a report for their project, make sure they are aware of your progress with it. Show them how a well-written manual or report improves their product. Share your work with them in exchange for their help.

Show intelligent interest in their work.

Show interest in what they are doing, and demonstrate your ability to understand by asking questions. Most people like to talk about their work when they have an attentive, interested audience. You can direct the conversation and give them appropriate feedback by asking for clarification when you need it.

"Intelligent interest" means listening and providing feedback, but does not include pretending knowledge you don't have or allowing your source to ramble on after she's lost you. It destroys your credibility when you try to write without understanding or hear without listening.

Check your facts.

The most common complaint from technical people is that writers do not check the facts, and write without understanding the subject. If you have the time and resources, research the subject before you interview the technical people. In a programming environment, for example, read the specifications or technical memos, examine the code or experiment with the program if it's available.

By preparing well, you can ask intelligent, useful questions. If you don't understand, ask; most people enjoy answering good questions about their work. Don't release your document for review until you have verified the information.

Encourage them to share their ideas.

Because they are personally involved in the project, technical people usually have opinions about how it could be presented to others. Find out what these opinions are. This is especially important if the end result will be used by the technical people themselves, but not to be overlooked even if they have nothing to learn from the finished product.

Once they have expressed an opinion, show your appreciation for their concern and, if possible, let them know how it helped you...even if you didn't use the idea.

Provide feedback to your reviewers.

Everyone likes to know that his/her thoughts were considered important. Get back to your sources and let them know that their efforts were appreciated, and that you understood what they were telling you. It's possible to misinterpret their notes on your draft, and therefore it's important to discuss their comments with them.

Take the time to learn the jargon.

Each task group has its own special language. Jargon develops as a short-hand form of communication, and serves to unify the group. Learn it, and you are one step closer to becoming an accepted member of that group.

Make sure your project is scheduled with theirs.

If possible, see that your manual/proposal/report is scheduled into the work load. By including it in the schedule, you can help the technical staff plan for their part in the writing process, help them see where it fits into their other work, and make yourself a part of the group's task force. Whenever possible, documentation should be treated as a part of the project, not as something separate from it.

Become a familiar face.

Hiding in another department hardly encourages good communication. If your office is elsewhere, be a frequent visitor to the technical areas even when you don't need specific information. Get yourself invitations to meetings. Be a quiet observer. Keep in touch with the product's development stages. If you are informed all along, you will be able to write a well-researched document without last-minute pressures or panic.

Start when they start.

If you have to play catch up to get information about a project, your sources will be involved in other things when you need them. It's best to start gathering the data while they are creating it, even if the data will change along the way. This is a good time to develop a plan outlining what you will write, and to establish a good working relationship with the project team. You can learn one step at a time instead of facing a mountain of old information that your sources now take for granted. If you start when the technical people start you will be better informed when you're ready to write.

Get support from management.

If management supports your efforts to maintain good communication channels with the technical staff, you're half way there. When the supervisor of the technical group endorses their cooperation with you, they may feel more comfortable giving you their time. When you don't have the time, resources or proximity to the technical staff that you need, supportive managers--yours and theirs--can help you get them.

If you make the effort...

It's appropriate for people on the technical staff to expect something in return for their time and cooperation. It's up to you to show them what is "in it for them," whether it's a more favorable reception of their product, a document that will help them do their work, or recognition of their ideas.

If you are aware of their concerns and make an effort to address them, you should soon find yourself not only respected, but depended upon.

FRIENDS OR FOES?
THE RELATIONSHIP BETWEEN WRITER AND EDITOR

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Many writers feel that editors are necessary evils who must be endured. However, having a good technical editor as a resource can save a writer considerable time and many headaches. Writers must learn how to use the editor in all stages of the writing process rather than just at the end. If the writer and editor can work as a team, the final product will be a quality publication.

Writers and editors are friendly adversaries at best, and out-and-out enemies at worst. The writer feels the editor is undercutting her authority and criticizing her writing, and the editor thinks the writer undervalues editing skills. Although the problem is common, it can be resolved. The writer and editor can work together as a team to create documentation that is better than either could produce alone.

I have been a technical writer in the computer industry for three years. Most of the articles I have read about the value of editors are written by editors (one tends to be skeptical of people who blow their own horns). Therefore, I feel it is time for a writer who has had good results from working closely with a technical editor to speak up.

Several things seem necessary before the relationship between writer and technical editor can work. First, both must be professional; that is, the finished product must be more important than individual egos. Second, the editor must be a technical editor, not just a literary editor. Unless the editor is familiar with the technical end of the business (whether it be computers or farm equipment), the writer will question her credibility. Third, the writer and editor must respect and trust each other enough to be direct in their dealings with each other.

THE CRAY STYLE

I am presently a technical writer at Cray Research, Inc. -- a company that designs and manufactures supercomputers. The publications department in the Software Development Division is responsible for all user documentation which includes: reference manuals, internal manuals, operator's guides, and site planning manuals. The department has a staff of writers, editors, and production personnel who work on a manual from its inception until it goes to the printer.

At Cray, the deadlines are very tight. New software cannot be sent to a customer without the manuals to support it. After the software has been thoroughly tested, it is ready to ship and the manuals must be in the printed version. Each writer may have only six to nine months to write or update five or six manuals. The situation is difficult because software that has been documented in the manual can be left out of the shipment at the last minute, or software can be added without the documentation reaching publications in time to be put into the manual.

Another problem involves hardware documentation because a computer cannot be shipped to a customer without the hardware reference manual and the site planning manual. New product lines are announced before a working machine is available for shipment; therefore, the writer can be put in the position of writing a manual while the engineers are still designing the machine. Although this dynamic situation allows the writer to learn the machine thoroughly, it can be very frustrating for the writer to be continually changing the manual due to design changes.

THE WRITING PROCESS

At Cray, a writer may work on new manuals, or incorporate changes into existing manuals as rewrites or change packets. All the manuals are changed and stored on a Wang word processing system so changes are fairly easy to make. Each manual goes through two reviews by technical sources. All reviewer lists include the editor who performs literary reviews and production edits. She sees all the manuals for every review so she knows what is in all of them.

No matter what type of manual the writer is doing, she goes through the same process. She receives documentation from a programmer or engineer, organizes and writes it, puts it into standard format, and sends it out for the first review. The first review is the major technical review.

When the manual comes back from first review, the writer resolves any discrepancies, gets the answers to all questions, and makes all the technical changes. The writer also decides what editing changes to incorporate (formats are dictated by the corporate style guide) and makes those changes. By the time the manual is sent out for second review, it is fairly clean. Second review is only for polishing. Major problems, such as organization or technical inaccuracies, are already resolved.

Following second review, the writer makes any final changes, prints a copy of the manual, marks the copy for production work, and turns it into the editor. The editor does a production edit, to ensure the manual meets corporate style and standards. She turns the copy into the production staff who produce camera-ready masters.

CONSULTING THE EDITOR

Planning is an essential part of good writing, but time is a luxury at Cray and to many publication groups. Sometimes a company is more concerned about meeting deadlines than the quality of the manuals. Therefore, the writer needs to use every tool at her disposal to write a quality manual within a limited timeframe. One resource often overlooked by writers is the technical editor.

Working with the technical editor from the planning to the printing of the manual does the following.

- It saves time. If the editor is consulted early, problem areas can be recognized before the last minute.
- It produces a cleaner manual. The manual is cleaner and more accurate for reviews. This builds the trust between the writer and technical reviewers. Everyone knows how hard it is to trust documentation full of errors.
- It allows for brainstorming. The editor can generate questions in the writer's mind about the technical information: its completeness, appropriateness, presentation, and style. Checking on technical material can be done before the manual is seen by a lot of people.

As a result, the writer looks good.

For this paper manual writing is divided into three stages: research, rough draft, and first review copy, and covers the ways a writer can use the technical editor's expertise. The discussion focuses on a new manual but the steps also apply to change packets and rewrites.

Research

When a writer is assigned a new manual she must first define the scope of the manual: the type of manual, what material goes in that type of manual, the audience, the condition of the source material. When she receives the material from the technical source, she spends some time becoming familiar with the information. Any initial questions require consultation and explanation from the source person.

Once she has finished the initial research phase, she is ready to organize her material. Each writer handles this phase differently. However, whether a writer uses a formal outline or does the rough organization in her head, this is a good time to begin consulting the editor.

The editor and writer can conduct brainstorming sessions before text is put on paper. Since the editor is familiar with all the manuals, she can help define manual type and discuss ways similar information is presented in other manuals. They can also discuss different methods of organization and formatting. The two should work as a team with the editor presenting options and the writer making the final decision.

The editor is acting as a consultant. The writer is the decisionmaker and may choose a completely different method or a combination of methods. That is her option and responsibility.

Rough draft

Usually the editor and technical reviewers do not see a manual until it is ready for a first review. By that time the organization is established. A better method is having the editor review sections of the manual as they are written. The writer can include artwork in its rough state, allowing feedback on the suitability of the art: how well it goes with the text, how easy it is for the reader to follow. If the rough edges are eliminated before first review, the technical reviewers can view cleaner copy and concentrate on the technical aspects of the manual rather than how it looks.

If the editor sees each section separately, she can make suggestions before the manual is too far along. Any superfluous information, organizational problems, or parts that might be confusing to the reader can be eliminated early. It is easy for the writer to fall under the spell of jargon once she starts getting close to the material. This review helps eliminate jargon or at least define terminology. As the manual evolves (and manuals do evolve rather than spring fully born from a writer's head), the writer manipulates, nudges, and molds it into a readable working document. The editor, with her expertise in audience identification and knowledge of the scope of the company's publications, can help make the process much easier for the writer.

Official review

Following this method, then, the writer is ready to send out the manual for its first technical review. The editor can now see how the manual fits together as a whole, do a literary edit, and concentrate on the details. She is familiar with the material at this point and usually can find problems she missed the first time through.

CONCLUSION

This system can work in large or small publications departments. In a large organization with several editors, each editor can specialize in a particular area like operating systems or a particular machine line. In organizations with only one editor, that editor would be responsible for everything. Although all publications departments may not have deadlines as tight as those at Cray, a good relationship between editor and writer is still valuable. It allows the writer to use an additional source person, one whose area of expertise is language.

Writers and technical editors can and should work together as a team rather than dealing with each other as adversaries. The approach I have suggested requires rethinking the role each plays in the publication process. It requires that we recognize each other's professional strengths and use them to produce the best product possible.

THE WRITER AS RESEARCHER, EDITOR, AND REPORT TASK LEADER (OR, HOW THE REPORT IS CREATED AT A HIGHLY DIVERSIFIED RESEARCH COMPANY)

by

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1982 Recognition
Award, STC
El Camino Chapter

A final report at a research company may result from multiple authors with various backgrounds. These authors' writing styles may vary as widely as their backgrounds. Also, few of these authors share the same attitudes toward writing a final report. A final report evolves smoothly when a technical writer becomes report task leader, helping the multiple authors to sound like one in a report that follows a logical order.

Final Reports: ANTICLIMACTIC?

Although "Final Report" is an impressive name for a document, the writers of these reports are not always impressed. After all, the work is complete, and the client has the product in hand. However, at my company, the "product" is usually the report. I will describe the report's creation and my ideas for making this report an impressive product.

The report, at my company, contains our true product: research. Instead of machinery, hardware, or software, my company produces ideas. Ideas, refined and processed by our research staff, take their final form as report text. By the time a report goes out, we usually have sold ourselves and our ideas to a client. This brings me back to my first point: the work is done, and the client has the product in hand.

I said that the product is the report, at my company. The report's contents, though, have taken other forms during earlier stages of our work. These are other forms of technical communication:

- Structured interviews
- Presentations
- Proposals
- Progress reports
- Tables, charts, and graphs

All of these make powerful packagings for our ideas while these ideas are being refined and processed. Clients receive these ideas at regular intervals and often contribute to them. The report, when it appears, tells a client nothing new.

That last issue reveals one reason why writers are not impressed. Writers at my company, researchers who prefer the lab or the library to the pen, tend to feel that reports are anticlimactic. This attitude appears in researchers elsewhere. For instance, an editor friend at another company was told by an engineer, "Don't spend much time on my report. They won't read it, anyway." Familiar? Probably! Technical researchers often view writing as a necessary evil. Why labor over writing when the clients are sold on ideas that are packaged in other forms? Why is a report worth doing?

What's Special About Final Reports?

Consolidation, to me, makes final reports special. Diverse departments and individuals combine efforts and client input into a myriad of ideas. These efforts fall together in a final report.

As communicators, we appreciate this consolidation. Our colleagues in research specialties look at smaller pictures. They need our help in seeing the bigger picture, the combined efforts of the team.

The bigger picture is clear to me, because of past work in the publications department, where editing and production occurs. The actual writing occurs where I now am, in a research department. In direct work with the research team, I observe attitudes during writing.

With a research team, I produce earlier forms of communication, those preceding a report: presentations, tables, charts, and graphs.

During this project work, I interact with colleagues who hate to write. Thank goodness, there are always those who write well and enjoy it! Such people help me to convince the others that the report matters. Prompting the research team to discuss the report arouses group spirit.

Collecting Text from the Reluctant

Most of our reports result from team writing. Most writing teams contain the willing and the able, but then also contain the reluctant. To ease writing tasks for my colleagues, I see myself in six roles:

- o Diplomat
- o Listener
- o Interpreter
- o Decisionmaker
- o Task Leader
- o Unifier

These roles may vary in dominance. However, when one role dominates, another does not disappear.

The first role, diplomat, challenges one's strength. Might you not feel anger on hearing, "No one's going to read that, anyway"? Also, a writer needing text from another writer may find hostility or indifference when requesting this text.

A diplomat keeps neutral. Hostility or indifference, when directed at writing tasks, share roots in fear. Fear of writing may persist, even in one who communicates well in other ways. Such a person may draw or speak well (capturing client support), yet freeze at the task of text writing. While understanding this fear, the diplomat recognizes the talent that such a person has. This understanding, combined with talent recognition, enables the diplomat to start a friendly discussion.

As diplomat, I might visit such a person, my notebook in hand, asking for advice on diagramming an idea. That idea might be a report chapter. I've spent hours studying material in notebooks or on blackboards, discussing the material with the "reluctant" writer, who has suddenly become quite expressive.

Such discussions bring me to the next role, listener. As diplomat, I've helped someone to express ideas; as listener, I receive the ideas.

The listener role merges with the next role, interpreter. The interpreter can create text from a sketch, or create a sketch from discussed ideas.

In any case, the two roles form a partnership. The listener receives the ideas, while the interpreter processes them. Processed ideas may be restated as questions, paraphrases, or other media such as charts or graphs.

By promptly restating ideas, I learn the accuracy of my interpretation. Unclear ideas will not become muddy text.

Text takes form at this point, moving ideas outside of researchers' minds for use by the team. The team may now order and shape these ideas to suit the needs of the report.

What are the needs of the report? I'm usually told, "That's up to you." At that time, I take the decisionmaker role.

Most of us aren't allowed to make all of the report decisions. I'm not. As prime interpreter of the report, though, I may decide on consistencies (e.g., person-year versus man-year). A major question that I raise before any decision can be made: Who has the strongest preferences and/or the most authority? Client? Project leader? Others?

Project leaders often tailor reports to clients. From report to report, uniformity varies, despite a company style guide. Uniformity within one report is a more realistic goal!

My favorite uniformity role: One word -- one thing. On a writing team, this rule must be restated often. I was on one team that generated all of these words for the same thing: bags, sacks, containers, and pouches. I began wondering, Do I have one paper by four writers, or four papers by one mixed-up writer??

Uniformity creates a formidable task for the decisionmaker when writers number four or more. Other decisions might include these: Client desires, order of ideas, re-use of presentation items (e.g., charts), deadlines, meetings, and report format.

That list could go on forever. Meanwhile, these decisions bring on the next role, task leader. A task leader ensures that decisions are followed. To ensure this, the task leader also plays diplomat, listener, and interpreter. Combined influences from these roles keep the report team communicating and producing.

As the team produces, the need for unity grows. Hence, a new role unifier, emerges. The unifier role overlaps the preceding roles (decisionmaker and task leader).

As decisionmaker, the unifier makes sure that consistencies occur. As task leader, the unifier monitors team progress. Under the unifier, all previous roles work, while team tasks interweave. This unity creates report pride.

All six roles, played in conscious order, help to guide a team report to completion on time, while also making less work for the publications department.

Playing These Roles

These roles are enhanced by the following five suggestions:

- o Listen
- o Be tactful
- o Be flexible
- o Encourage feedback
- o Keep the action going

Suppose that your team must write about rapid air movement. One writer won't produce until he's tried this: he wants to blow paper all over his office with his window fan.

Following these five suggestions, you choose not to say that he is crazy. You could, though, ask why the action is necessary, and the reason could grow into useful text. If the action must proceed, then stand clear, take notes, sketch, and keep asking questions!

That's extreme, but it would extract text from a reluctant source! In more than one way, it would cause feedback!

Outlines are more realistic examples of my roles and suggestions in action. How do these outlines develop?

I might be new on a project when I'm asked, "What should a final report look like?"

Then I must quickly gather background information, submit a draft for feedback, and redo everything (usually!), while the outline thoughts are shared and processed by team members.

One recent outline, first headed by Roman numerals, ended up headed by military numberings (1.1, 1.1.1 ...), with the idea order rearranged. That outline was approved, then distributed among team members, whose names appeared beside their writing assignments.

The outline, when it included team member names as described above, become a scorecard. As the writing progressed, marks appeared next to the names. When a section was drafted, the writer's name received a star. The use of stars had a positive effect on teamwork, encouraging both writing and exchange. When the outline showed that a section was drafted, team members could ask that section's writer for a copy. Exchanges of work encourage style consistency.

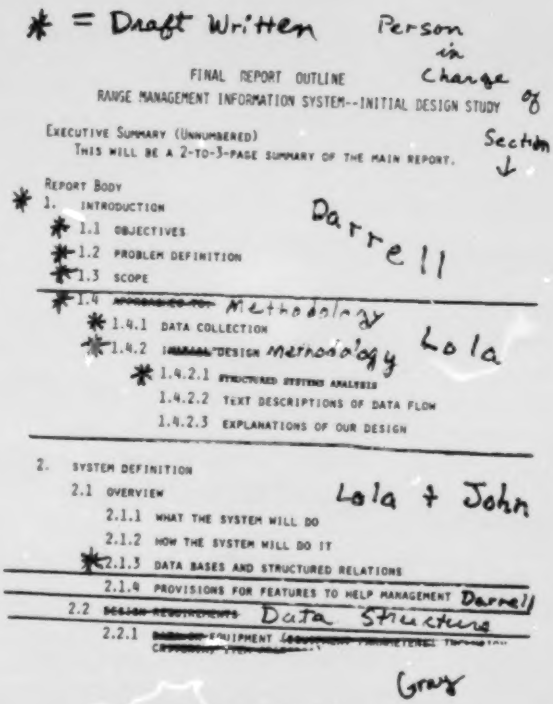
When an outline is used in this way, I call it a "living" outline. Figure 1 shows an unusually clean example of such an outline. It results from and feeds into the five suggestions named earlier:

- o Listen
- o Be tactful
- o Be flexible
- o Encourage feedback
- o Keep the action going

All five suggestions help to keep action going. Whenever a new outline is produced, all of these suggestions are in use.

A "living" outline generates powerful and productive feedback. The most useful types of feedback, in my work, are the following:

- o Client input
- o Ongoing discussions (with client and within the project team)
- o "Living" outline
- o Decisions/agreements



* = Draft Written

Person in Charge of Section ↓

FINAL REPORT OUTLINE
RANGE MANAGEMENT INFORMATION SYSTEM--INITIAL DESIGN STUDY

EXECUTIVE SUMMARY (UNNUMBERED)
THIS WILL BE A 2-TO-3-PAGE SUMMARY OF THE MAIN REPORT.

REPORT BODY
* 1. INTRODUCTION — Darrell
  * 1.1 OBJECTIVES
  * 1.2 PROBLEM DEFINITION
  * 1.3 SCOPE
  * 1.4 ~~[illegible]~~ Methodology — Lola
    * 1.4.1 DATA COLLECTION
    * 1.4.2 ~~[illegible]~~ DESIGN Methodology
      * 1.4.2.1 STRUCTURED SYSTEMS ANALYSIS
      1.4.2.2 TEXT DESCRIPTIONS OF DATA FLOW
      1.4.2.3 EXPLANATIONS OF OUR DESIGN

2. SYSTEM DEFINITION
  2.1 OVERVIEW — Lola + John
    2.1.1 WHAT THE SYSTEM WILL DO
    2.1.2 HOW THE SYSTEM WILL DO IT
    * 2.1.3 DATA BASES AND STRUCTURED RELATIONS
    2.1.4 PROVISIONS FOR FEATURES TO HELP MANAGEMENT Darrell
  2.2 ~~DESIGN REQUIREMENTS~~ Data Structure
    2.2.1 ~~[illegible]~~ EQUIPMENT ~~[illegible]~~
Gray

FIGURE 1. "Living" Outline

Lists, like outlines, aid the team greatly, especially because some team members are dedicated loners. They need listings that tell them what will happen when, and who needs to see what.

By using the ideas mentioned earlier -- knowledge of the six roles and the five suggestions for playing them -- I've been able to more report work ahead without lighting fires.

Instead of fires, interaction awareness can move the teamwork along. Figure 2 shows the typical report interactions that occur at my company. This figure shows actions rather than control; control shifts.

Figure 2 proves the importance of keeping the action going. Any flows can get stuck if part of the team forgets the rest of the team.

This figure shows that action may begin with either the project leader or the client (thus you see a double-headed arrow).

Next, a research team forms, including project leader and task leader. Though there are separate blocks for these tasks, the same person could perform all of them. I often move between two blocks: report task leader and researcher.

The project leader, researchers, and report task leader meet with the client after the project begins, and report ideas originate side-by-side with project task ideas.

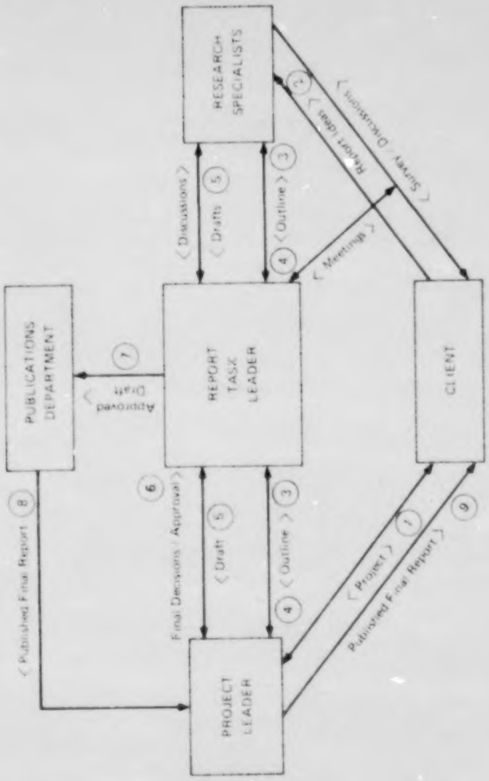

RESEARCH SPECIALISTS
REPORT TASK LEADER
PUBLICATIONS DEPARTMENT
CLIENT
PROJECT LEADER
< Discussions >
5 < Drafts >
< Outline > 3
4
< Meetings >
< Survey / Discussions >
2 < Report Ideas
7 < Approved Draft
6 Final Decisions / Approval >
< Draft 5
4 < Outline > 3
< Project > 1
9 Published Final Report >
< Published Final Report 8

FIGURE 2. Report Creation

As ideas flow, discussions continue, flowing from client to researchers to report leader to project leader and back to client. Outlines develop, flowing from report task leader to both project leader and researchers. After receiving inputs from both places, the outline returns to the report task leader.

The draft circulates in a manner similar to the outline, and client input occurs in ongoing meetings. Revisions continue until final project leader approval, when the draft goes to the publications department for final editing and production, then on to the client, who (we hope!) soon calls us again.

PRODUCING TECHNICAL DOCUMENTS: A GAMING SIMULATION

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Develop service manuals and other techinical documents.

Design educational games and gaming simulations.

Member, Southeastern Michigan Chapter, STC.

This workshop will help participants learn how people in an organization can more effectively work together to produce technical documents. The workshop involves three phases:

1. Introduction
2. Simulation Exercise
3. Discussion/Debriefing

BACKGROUND INFORMATION

As scientists and engineers continue to expand technologic boundries, the need to more effectively communicate technical information increases. Researchers must disseminate data about their findings. Manufacturers must provide customers with details about how to assemble, operate, maintain, and service their products. Technical experts must relay their understandings to those who wish to learn.

Although much effort is expended to put technical information in written form, the quality of technical documents varies greatly. Some documents are well organized and easy to understand. Others do more to confuse the reader than they do to help.

One strategy for developing more useful technical materials is to strenghten the team responsible for producing them. The team can include writers, editors, graphic artists, engineers, managers, and others. If technical documents of high quality are to be produced, team members must have a common understanding about the priority and the intended use of these documents. They must also work together to carry out their document production responsibilities.

PURPOSE

The purpose of the workshop is to help participants learn how to more effectively produce technical documents.

OBJECTIVES

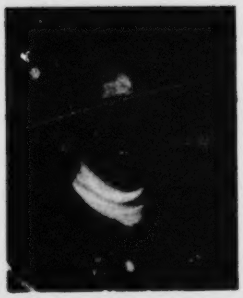
1. To help participants learn how to be more effective members of the document production team.
2. To help participants learn how people on the document production team can positively and negatively affect the development of a technical document.
3. To help participants learn the steps for producing technical documents.
4. To help participants develop planning skills that can be used to produce more effective technical documents.

DESCRIPTION

The workshop will involve three phases. During the first phase, the steps for producing technical documents will be outlined. The roles of the people responsible for producing documents will also be described. During the second phase, participants will take part in a simulation exercise. They will assume some of the production roles and work together to carry out some of the production steps. The third phase will involve a group discussion about the simulation, the document production process, and the relevance of the workshop to actual work situations.

THE CREATIVE AUDIENCE
HANDLE WITH CARE

Eileen M. McAvoy
The Gillette Company
Boston, Massachusetts



Ms. Eileen McAvoy
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Member International Graphics, Inc.

This paper will address the special problems associated with teaching technical material to creative people. It will explore how traditional learning research can be used to implement better understanding and retention while highlighting some common flaws in current practice.

This research should help instructors to set up new technical instruction, or to evaluate and improve old instruction. This paper may also explain to those lacking in technical finesse why they have not been able to learn.

With the increased availability of computerized writing, editing and production devices, many organizations have begun to train professional staff members in advanced technology. This is a wonderful idea in theory, but there are a few major flaws in current practice:

1. Writers are generally highly creative individuals.
2. Creative people would rather jump in front of a moving freight train than read the manual.
3. Creative minds tend to think visually. During a concentrated verbal lecture on computer buffer zones the creative genius generally works out her plans for winning the Pulitzer Prize, and for training her secretary to use the machine for her.
4. Most creative people gave up on machines when their parents gave them an ETCH-A-SKETCH and will wait 45 minutes in line rather than use the automatic teller at the bank. (Creative people always think that "THE COMPUTER" is responsible for their bounced checks and dunning notices).

The solution to this dilemma is, of course, that to reach the creative audience, the instructor must be even more creative. When teaching word processing to a room full of computer jocks,(even creative ones), the instructor can try out his entire repertoire of buzz words, regale his captives with stories about how he single-handedly saved the company when the payroll run bombed, pass out the manual and pat himself on the back for how fast the kids caught on. Not so with a creative audience. No, sir. This same approach with the creative audience will create a variety of negative responses ranging from panic to outright hostility.

So, Instructor person, your mission is to create a course that is structured, well-organized, and visual as well as verbal. Despite the blase exterior, the creative mind not only wants to know how, but why. There is a reason for this of course. A simple mind only wants to know the steps to take. This type of individual would prefer to let others do the thinking rather than clutter his mind with details. This kind of person does not get to be a writer, or an editor. This kind of person makes a wonderful career clerk, or an ardent Phyllis Schaffly follower depending upon your perspective.

But, before we even begin to address the instruction, we must consider the instructor. Is the right person teaching the course? What businesses often fail to realize is that the best programmer or technician does not always make the best instructor. This is no coincidence. Technical people spend most of their time in technical courses which do not leave a great deal of time for communications training. And, people who learn things easily are seldom good at explaining these things to people who don't. And talking to machines all day leads to an unusual instructional style.

To teach anything, an instructor must know his educational principles as well as he knows his subject. It matters not if you know your material if you can't explain it to anyone else! But, whether your background is education, communication, or database management, the following general rules can help your performance:

1. NEVER TELL A CREATIVE PERSON THAT THERE ARE RULES. Instead of listening to you, the creative mind will try to think of exceptions. (Frank Sinatra's "I Did It My Way" is the creative person's theme song.) So, it is better to offer your suggestions than to suggest that things are etched in stone.

Frequently things are not etched in stone. During a word processing course I was told that it was impossible to delete a column. I proved that this was false but missed the rest of the lecture while I tried to figure it out.

2. BE OBJECTIVE. Set measurable behavioral objects that tell the learner in CONCRETE terms what he or she will be able to do upon completion of instruction. It is not enough to say that he will understand the graphics terminal. Be specific. Say instead that he will be able to turn on the machine and create a bar chart with two colors. This will help you to evaluate your instruction by whether or not the student could actually perform these tasks.

This self-evaluation is a valuable exercise, but there is another, even more fundamental reason for objectives. That is, they create expectations. Robert Gagne[1], a prominent cognitive learning theorist believes that these expectations are necessary for the reinforcement of learning. He explains a theory espoused by Estes:"He,(Estes), says that reinforcement occurs because an expectancy of the learner has been confirmed. This conception fits well with the rest of cognitive theory, because one does assume that the learner initially acquires some expectation of what she will be able to do when she has learned. If she is able to do what she expects, and the feedback from the environment tells her she is able to do it, then that is what reinforcement is, according to Estes."[2]

In simple terms, suppose I am a learner. And, I know that after I complete my first lesson in word processing that I will be able to recognize the main menu, create a ten line document, and insert, delete and replace within that document. When I find that I can actually do this, not only am I astounded at my superlative achievement, I have reinforced my expectations. This is learning. If I find that I cannot meet these objectives, I know that I must check with the instructor before the next lesson. This is embarrassing. But at least I know where I stand before it is too late.

Aside from setting overall course objectives, it is important to establish goals for individual procedures as well. I remember attending a lecture once where the instructor spent 45 minutes explaining how to set up a transaction set. When he finished this explanation, a student raised his hand and said: "I think I know how to create a transaction set, but I'm not quite sure why I want to. What is a transaction set?" A better approach would have been to show what a transaction set does, what the results look like on paper, and the reasons why a person would want to use a transaction set. Then and only then should the instructor explain how to create and use one. You see, it is difficult to obtain knowledge in a vacuum. If one doesn't know the goal of a task, it's hard to appreciate the steps necessary to get there.

3. WHAT THEY SEE IS WHAT THEY GET. Always try to present a visual example of what is going on inside the computer guts. Feltboard displays, overhead transparencies, or even a chalkboard sketch will give a frame of reference to what you are saying. (When I am trying to explain where the files go inside the computer system, or how a file gets moved in and out of the "buffer zone", I create a model on a feltboard. Then I cut files out of felt that I can move around the model so that students can visualize what is happening. Strangely enough, the instructor discovered some interesting facts herself just by using a physical example). Educational research has shown that after a few weeks people still remember 80% of what they have seen and only 30% of what they have heard. Also along these lines, it is helpful to provide typed course notes with room for the student to make notes. (The only hazzard in this is that the space will be used for doodling instead of note-taking. But, the alternative is that the person may take no notes at all).

Now that I have sold you on the importance of visualization in learning, you might want to know that Gwen C. Nugent[3] conducted a study at the Barkley Center, University of Nebraska to find out which method of instruction, or combination of methods, produced the best retention. "Results of this study generally support the original hypothesis that presentation of information through two-symbol coding systems would be superior. The combination of pictures (iconic symbols) and audio or print (linguistic) symbols, was superior to single presentation in all but one case. The combination of symbol systems evidentally exploits the potential of each and promotes a synergistic interaction."[4]

Never let it be said that this author neglected her iconics or linguistics! My version of "synergistic interaction" involves a combination of word slides, sample slides, and typed course notes, all interspersed with sparkling dialogue. It is difficult to tune out when one's senses are being bombarded. But, if you do not believe me, perhaps you'll listen to a professor from Princeton.

Albert Einstein,[5] the reknowned physicist, recognized this same need to present a message in many ways. "When Einstein had thought through a problem, he always found it necessary to formulate this subject in as many ways as possible and to present it so that it would be comprehensible to people with different modes of thought and with different educational preparations--"[6]. And who am I to argue with Einstein? He believed that any empty space could be broken down and described in small particles, and that problems could be more clearly understood when expressed spatially.
When we break a large idea into smaller particles and represent the interaction spatially, we can better understand the processes, and the framework in which they exist. For a student who hated school, Einstein was some educator!

I think we can agree that visuals are an asset to a presentation, so when we prepare these visuals we might keep in mind the findings of Von Restorff[7] on dissimilar material. He found that the more dissimilar material is to be learned, the more easily it is remembered. If I were lecturing on the uses of computer graphics in business and suddenly burst into the Gillette jingle, you can bet you'd remember it. (My supervisor certainly did.)

In fact, Erickson[8] found that even printing a word or an exhibit in a different color makes it more easily remembered. So, when we want to emphasize a key point or word on a visual, we should print it in a different color from the surrounding text. Treisman[9], another learning theorist suggests that perceptual information is scanned and "encoded along a number of separate dimensions--color, orientation, spatial frequency, and so on. Any features present in the same fixation of attention are combined to form a single percept."[10] Should you doubt this, what color are the McDonald's golden arches? Could you forget if you tried? This may suggest, and I believe it does, that by color-coding certain instructional concepts, the learner is better able to associate related concepts with one another.

For example, in the computer graphics course that I teach, I divide the various programs into slides of different colors, ie. when I'm teaching wordslides, I keep the background yellow. When I switch to Output Queuing, I keep the background blue. This way, the student at least realizes that I've changed the subject. But so far no one salivates or manifests unusual behavior in response to any of the colors.

4. PRETEND YOU WORK FOR "60 MINUTES". Ask hundreds of questions. Or prepare an in-class "quiz". For fear of appearing stupid, an intelligent person may be reticent to ask a question even when he hasn't the remotest idea what you are talking about. Sometimes, the neophyte does not know that he does not

understand until three weeks later when he has a deadline, and is unable to connect the terminal. Asking questions is about the only way you can tell if you are reaching your audience, while you are teaching. It is also a good way to check if they are conscious.

Research has consistently proven the value of immediate vs. delayed knowledge of results. A study conducted by James Johnston[11] and his colleagues in 1969 supports this conclusion. When students received the correct answer after completion of each example, they achieved significantly higher results than students who got answers after they completed the whole worksheet.

This proven approach, recommended by interrogators worldwide, can be an asset to instruction. While I do not suggest electric shocks for "wrong" answers, a few probing questions will get the intellectual juices flowing. I try to include at least one written in-class exercise per lecture. For example, I might ask the students to list the steps to create a bar chart, or to write which command to use to clear the screen, etc.

Along with this, I write questions in my lesson plan to make sure I ask questions at appropriate points. Some of my favorite openers are: "Could we have done this by...?", "Why couldn't we...?", or "Can you think of an easier way to...?" Creative people love to thwart the directions by coming up with their own way of doing things.

In any case, it's far better to answer questions during instruction where learners get immediate feedback, than later on when they get immediate frustration.

5. GIVE ME A BREAK! The way in which an instructor structures her lesson can be as important as the content of the lesson. When an instructor fails to notice that her students are comatose, that their eyes are glazing over and they're in the final throws of caffeine withdrawal, she loses the audience for the remainder of the lecture. And when she speaks extemporaneously about whatever comes into her head, she ignores the benefits of a structured presentation: general goodwill, good evaluations, and improved retention on the part of her students.

Those desiring good will in general might look into a study conducted by Johnson and Calhoun[12] in 1969. The results indicated a serial position effect:the material covered at the beginning of the lecture was most easily learned. The material in the middle was the most difficult to learn, and the material at the end was the second most difficult. People in advertising media have recognized this fact for a long time. When an advertiser wants to buy television time, he pays more for the first and last commercials during a station break than he pays for a commercial in the "middle". The informed instructor schedules his presentation to reflect this phenomenon.

When I lecture a class, I try to put the more difficult material at the beginning of the session when I have the students in the palm of my hand. Later, when they've realized what a mistake it was to take my course after lunch, I review by means of a written exercise, or question and answer period. After the break, I present some new material based on the earlier topics and review again to close the session.

Now if you really want to impress your boss at the next staff meeting, tell her about another structure-related finding called the "Zeigarnick Effect"[13]. (And if you're cagey enough not to tell her where you read this, she'll think you translated it from the original German.) You can just casually mention that B. Zeigarnick found that tasks interupted before completion were recalled better than completed ones. Research shows that "interpolated activity (activity similar to that being learned) which is scheduled within a few seconds of a learning activity has a greater inhibitory effect upon retention than if a few minutes of rest intervene before the onset of the new activity."[14]

This should be common sense, yet how many times have we listened to instructors who ramble endlessly with no plan of attack, and no time off for good behavior? Contrary to what these instructors believe, lack of organization is obvious to everyone.

6. DON'T BE AFRAID TO TOUCH. The terminal, that is. Many adults have an unnatural fear of machines. As the instructor, you must provide as many chances as possible for the user to touch the machine. Either use students in class demonstrations, or provide small group exposure before or after the lecture. By all means, give an assignment for the student to do independently so he can test out what he has learned. I pass out a list of instructions for brushing one's teeth. (attached) I suggest that if something this easy looks complicated on paper, how could foreign computer instructions look any different?

With regard to hands-on training, (as opposed to hands-off training), during 1982, Kearsley, Hunter, and Hillelson[15],(presuming most managers had mastered English literacy), conducted a manager's workshop in computer literacy. "We discovered that the best strategy for the teaching of the computer involved a lecture/demonstration/hands-on cycle in which the basic function or capability to be learned is explained, followed by a demonstration, followed by hands-on practice which either mimics or closely resembles the demonstration."[16] If it is not possible to have the equipment at the lecture, (too large to move, scheduling problems, terminal refuses to ride elevator, etc.), a dual-slide, single screen presentation may simulate the machine functions. On the right side you can depict the goal or final product, and any necessary menus, while on the left side you can list the steps necessary to arrive at this goal. In the absence of equipment for each user, an instructor can give each user, or group of users, a copy of the final output, keyboards, and any prompts or menus and have him (or them) list the steps to produce this outcome. (Working in small groups can be helpful here because it promotes communication between students. Students can sometimes explain things to each other better than the instructor can. In my lectures this is a given.)

Once again, this type of activity lets the instructor and the student know what the student understands before the end of the lecture. This increases the chance of success, and reinforcement, when the learner attempts to work on his own. This also increases the likelihood of the instructor's contract renewal.

When the user does work on his own for the first time, the teacher, or "usee", should structure the session for maximum learning. One excellent means of doing this is Computer-Assisted Instruction (CAI), or using the computer as a tool to teach the computer. An instructor can set up prompting routines that tell the student what to do next, or that quiz the learner on what he has learned. On a CRT, or screen, it is sometimes possible to have the instructions appear on the screen while the user is doing the exercise. At the very least, the student should have clear written instructions, and perhaps, tape recorded directions for fearful users. (As long as the tape does not conclude with "This machine will self-destruct in ten seconds.", because many users believe it will!)

6. OFFER GROUP THERAPY. A recent TIME magazine article cited: "In the office of the future, some executives prefer the past."[17] The writer goes on to describe an executive who insists that all computer print-outs be re-typed because he won't trust anything on green-and-white continuous paper. "Having built a career on intangibles like personality and leadership, executives may fear that a computer, with its unshakable command of facts and figures will erode their authority, say some psychologists."[18]

For whatever reasons, many users feel threatened that computers will take over the world. And even more importantly, that computers will take over their jobs. Explain that a computer is nothing more than a tool. With all the flashing lights and buzzing alarms, without a human mind the computer is no more valuable than the abacus. Think of it as a catalyst. It does what only YOU can do, except that it does it faster!

Now that we have justified the existance of computers, suppose for just a moment that I have attended your computer course. You have explained from the beginning what I should be able to do. You have made it clear all along why I should want to. You have stimulated my creative mind by asking me to think of other ways of doing things, and by telling me the "whys" as often as the "hows". The "hows" were brought home to me by your brilliant use of visuals, the "whys" by your willingness to let me in on your game plan, as well as your eagerness to answer my questions. You let me breathe. The structure of your class gave me time to review and absorb during the lecture, and the scheduled breaks gave me time to rest. You were considerate.

When it came time for me to try the machine, I found that I was not afraid, that you had equipped me with everything I needed to know, and that I really learned from my guided experimentation. I was a success.

This success was a result of your careful preparation, your consideration, and your awareness that I would probably not read the manual in my spare time. Or even my non-spare time. And since no one has ever canonized a technical instructor, the best that I can do is to give you a good evaluation at the end of the course. And, you can bet I'll take a course from you again!

Isn't this our goal as technical instructors?

P.S. The writer typed this herself using WANG Word Processing.

Special thanks to my "editors": Captain John Stibravy, USAF; Dr. Elaine Lewis, Boston University; Kate Dean, John di Targiani, & Kavin Moody, The Gillette Company; and Mary McAvoy.

COMPUTER PHOBIA IS NOT A TERMINAL ILLNESS

You can virtually perform these steps in your sleep, and yet, at one time you had to learn them. EVERYTHING looks threatening on paper, especially computer instructions. If something this easy looks this difficult when you write it out, how else can computer instructions look?

1. Hold long, blunt, unbristled end of instrument in left hand, if right-handed. Else hold in right hand. If neither condition is true, see User Manual, Chapter XXII, AMBIDEXTERITY.

2. Holding bristle-side-up, use other hand to select cold water and turn on tap while simultaneously holding bristles at a 90 degree angle to flow of water.

3. When bristles are moistened, turn off tap. (If you don't choose to go any further, return the brush to rack. Mother won't know the difference as long as the bristles are damp.)

4. Now, still holding instrument with bristles facing up, handle parallel to floor, pick up oblong tube with spare hand, unless label reads D-E-N-T-U-C-R-E-M-E. If this should occur, please call for assistance. Else, remove cap with spare fingers of hand that is holding the instrument. Squeezing oblong tube FROM THE BOTTOM hold tube mouth at 45 degree angle to end of bristles.

5. Being careful not to squeeze contents all over self, slowly apply a 1/4-1/2 inch stream of paste to bristles.

6. Replace cap and put tube down.

7. Move instrument to dominant hand making sure to keep paste-side-up. Should you fail to remember this, you must repeat steps 4-7.

CONGRATULATIONS! YOU ARE NOW SET UP. FOR TOMORROW'S LESSON, WE'LL TELL YOU WHAT TO DO WITH IT.

****This program written in C.O.L.G.A.T.E., Version 15.7., an obscure dental processing language supported by the A.D.A.

FOOTNOTES

[1] "Implications for Instructional Design; and Effects of Computer Technology on Instructional Design and Development: An Interview with Robert M. Gagne," Educational Technology (June, 1982)), p. 12.

[2] Ibid.

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"AN AUDIENCE MODEL FOR BUSINESS WRITING"

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This paper presents a model for analyzing the audience of business messages and discusses the writing decisions the model aids. To fulfill the psychological and informational components of an effective business message, our audience model elicits detailed knowledge of the message's context: the audience, the situation, the writer's purposes and reader's uses of the document. This data then helps the writer answer specific questions of content (kind and amount of detail), arrangement (sequence of detail, format) and style (sentence structure, diction, voice, tone). A completed audience model and the resulting message are given in the paper, with annotations illustrating these decisions.

AN AUDIENCE MODEL FOR BUSINESS WRITING

Effective business communication depends on a thorough knowledge of the context of the message: audience, purpose and use. Writers then use these parameters to decide questions of content (amount, kind of detail), arrangement (structure, format) and style (sentence structure, diction, voice, tone), and consciously plan their messages.

The following audience model provides writers with a systematic method for analyzing the communication context of business messages and making effective writing decisions. The model contains three sections. The first two--I) The Audience; II) Purposes and Uses--ask for both factual and psychological data on the readers and the primary and secondary pruposes and uses of the message. The primary purposes most influences composing. However, fulfilling this may depend on secondary purposes and uses, as our example makes clear.

Section three of the model asks for three kinds of information: 1) Content: specific content included or omitted, since the details writers choose to omit may be as significant as those they include. 2) Arrangement: structure (overall structure, sequence of paragraphs, sequence of details within paragraphs); specific formatting techniques for appearance on the page. 3) Style: broad guidelines for sentence length, structure and complexity, diction, voice and tone, as well as some more specific stylistic decisions. These guidelines then continue to aid writers throughout the composing process as they write the message and make further decisions.

The following example illustrates the information gathered in each section of the model and the resulting message. Although we have written the entries for explanatory purposes, in an actual composing situation many entries would be done mentally. In the left margin we have annotated the entries, to indicate how they aid the writer when composing.

MODEL AND ANALYSIS

I. The Audience

Gives factual information on the reader. →	A. Identification
	1. Name. Mr. Fred Stanton.
	2. Job Role/Title. President and sole owner of Roger Tractor Company, one of 15 Illinois distributors for B and R Tractor.
Begins to give information on technical experience. →	3. Job Description. Personally oversees all financial operations (sales, accounting, purchasing) of his business.
Aids in stylistic decisions. →	4. Relation to Writer. Distributor. Roger Tractor sells and maintains only B and R Tractors.
	B. Characterization.
	1. Factual
Aids in decisions on amount and kind of detail, and diction (level of technicality). →	a. Educational Experience/Training. Stanton has a B.S. in management and 15 years experience in agricultural implement sales but no formal engineering education or experience. He depends on his head mechanic and manufacturers' shows and seminars for technical information about agricultural implement developments.
Helps with decisions on amount of detail. →	b. Background on Specific

Problem. (degree and type of involvement). Stanton is aware that the P34's have several tricky new features which will make them highly marketable, but he does not know that his order for P34 pipe-layers will be held up because we have discovered a problem in the weight balance of the pipes. He does not have the technical background to understand the specific problem.

2. Psychological

Helps with content decisions since reader questions/needs must be met. →

a. Reader's Questions/Needs. Stanton's major questions will be about the shipment delay: why the delay and when he can expect shipment. Since peak sales begin in February, he will need reassurance that the P34's will be ready by that time and that the technical problems are not so serious as to interfere with the quality and marketability of the product.

Helps with content decisions and arrangement of details. →

b. Reader's Response. Stanton will be disappointed to hear of the delay. He may be concerned that the P34's are not really ready for marketing.

Helps writer decide what details to emphasize. →

c. Reader's Personal (idiosyncratic) Concerns. Having worked with Stanton, I know he places much value on dependability and, as a salesman himself, he understands the importance of good service.

II. Purposes and Uses

A. The Communication Situation

Assures that the writer has verbalized the context of the message. →

1. The Problem/Situation. Stanton has ordered five P34 pipe-layers from us and expects delivery January 15. As sales representative for B and R, I must inform Stanton that the order will be delayed one month.

Has stylistic implications: diction; tone. →

2. Contact with the Reader. I have met Stanton many times and our business relationship is friendly. I handle virtually all dealings with him.

B. Purposes of the Message (To inform, instruct, persuade)

Implies overall structure of message (indirect plan). Aids in content decisions. →

1. Primary. My primary purpose is persuasive: I want Stanton to keep the P34 order on the books. To accomplish this, I must also persuade him that the quality of the P34's is worth a brief delay and that this delay is actually in his best selling interest, since the delay will improve the product.

Tells writer the details to include. →

2. Secondary. My secondary purpose is to inform Stanton of the delay, the reason for it, and a new delivery date. By providing him with an explanation for the delay, I advance my persuasive purpose: the delay will result in a better product. Letting him know an expected delivery date will also further my persuasive purpose because he will know we are concerned about meeting his time of peak sales.

C. Uses of the Message (To gain knowledge, perform an action, make a decision)

1. Primary. Stanton will use the message to decide whether to keep the P34 order on our books.

2. Secondary. Stanton will also use the message to understand why the delay is necessary and when he will receive the order.

III. Writing Techniques

Assures writer has planned major content, section by section. →

A. Content (Details included/omitted, paragraph by paragraph)

P 1 Inform Stanton that I have received his sales records and that he had the highest total sales in his division.

P 2 Explain the delay. I'll omit technical details since Stanton is not prepared to understand the assembly process and I do not want to dwell on the flaws.

P 3 Inform him of the delay and give him an expected delivery date. Since we can't be sure of the exact date, I'll indicate a ceiling date only.

P 4 Even though he has my telephone number, I'll include it for his convenience and invite his questions. I'll then express regret at the delay and reassure Stanton of a quality, marketable product.

B. Arrangement

1. Structure

Assures structure is planned, from larger to smaller units.

a. Overall Structure. Indirect plan: point of compatibility--explanation--unfavorable announcement--future satisfaction, since reader needs to understand the reasons for the bad news before he will accept it.

b. Section by Section. I will begin by telling Stanton of his outstanding sales record since I wish to relate past and present sales to future sales of the P34's. Next, so that he will agree the delay is necessary, I will explain before I state the problem. I will then announce the delay, but immediately suggest when we will fill the order to counter the bad news. Last, I will instruct Stanton regarding his questions and reassure him so that the message concludes with his future satisfaction.

c. Within Sections.

Assures writer considers the traditional patterns for paragraphs (deductive/inductive--modes of development).

P 1 Inductive. Main idea last. Stanton needs to know where I got my information before I positively evaluate his sales performance. His actual sales performance is last since the outcome of his efforts is the best news and of most interest to him. Placing his sales performance last also allows a transition from his favorable past sales to his present sales expectations, in paragraph 2.

P 2 Inductive. Cause/effect. Main idea last (the delay). I begin with a neutral statement, acknowledging his order. I then present the cause of the delay so Stanton will agree with its necessity, when I announce it.

P 3 Deductive. Chronological order/Process. Main idea first (explicit statement of the delay). The remainder of the paragraph outlines the steps necessary to complete his order. The last step, when he can expect the order, closes the paragraph and directs emphasis toward the future and a favorable outcome.

P 4 Inductive. Instruction. Main idea first. To continue directing the message toward future satisfaction, I open with instructions regarding Stanton's questions. To avoid excessive emphasis on negative language, the apology is embedded between the instructions and the closing reassurance of quality.

Assures writer considers effective appearance on the page.

Aids access to information and emphasis of detail.

2. Format

a. Lists. None.

b. Foregrounded Sentences, Phrases, Words (capitalization, underlining, dots or dashes, parentheses, hyphens, position on the page, white space, numbering). None.

c. White space. No special us.

d. Headings. None.

Writer sets broad guidelines, further particularized during composing.

C. Style

Prepared for by considering audience's educational level.

1. Sentence Length, Complexity, Structure. I will use sentences averaging 15-20 words since Stanton's educational level doesn't require the use of very short sentences. I will use a combination of sentence structures: simple or compound sentences for emphasis when I convey positive or neutral information (his sales record, receipt of his order, etc)--complex sentences when I

want to de-emphasize information that is likely to create doubt (the problem with the assembly).

Prepared for by considering writer's purposes and reader's needs.

2. Diction. (Overall vocabulary (level/choice of specific words). I will use positive diction throughout to elicit Stanton's confidence. I will state the delay in terms of what we must do, rather than what we cannot do. I will use "minor" and "bugs" to de-emphasize the technical problem with the P34's and "perfected" to stress the positive outcome of the delay.

3. Voice (Overall voice--active, passive/voice in specific sentences). Active voice will predominate since most of the information does not require subordination of the acting agent. However, when I wish to place emphasis on the reader (congratulating Stanton on his sales record), I will use passive voice. I will also use passive voice when explaining the problem with the P34's because I wish to avoid placing blame on any one in particular.

Aids writer in planning conscious use of voice and tone.

4. Tone/Approach to Reader. (Overall tone/tone in specific sentences/use of business writing principles) My overall tone will be colloquial, suiting our familiar business relationship. In the paragraph announcing the bad news, however, I will be more formal to indicate B and R's sincerity. I will also more concern in my closing, to stress our regret at the delay.

Assures consideration of business writing principles.

--Use of business writing principles.

You-viewpoint. I will keep the reader in the foreground by stressing you (e.g. "your company").

Reader-benefit. I will stress the reader-benefit of the delay--it will correct the flaws in the P34's so they will be marketable.

Success consciousness. De-emphasizing the flaws will give a successful tone to my letter. I will also not mention taking the order off the books, but will assume Stanton will want the order filled.

Positive language. I will stress what we are doing--holding the order--rather than what we are not doing--shipping. I will end by emphasizing the usual reliability of our product, which the delay will ensure.

Service Attitude. Stressing our desire to sell only a perfect product will indicate that our motives extend beyond profit.

Re-sale. The diction used in the last sentence will also serve to resell the reader on the P34's--e.g. "our usual reliable product."

COMPLETED MESSAGE

Your company's quarterly report was circulated to all the southeastern sales representatives last week. I would like to congratulate you on Roger Tractor's performance for the last three months of this fiscal year. You may be interested in knowing that your firm led the Southeastern Division in total sales.

I have your order for five of the new P34 pipe-layers. As you know, this model is the latest product introduced by B and R Tractor. Because of the new process involved in assembling the P34, some minor technical problems have arisen. Therefore B and R has decided not to ship any P34 pipe-layers until all the bugs are eliminated.

Because of this freeze on shipments, I must hold Roger Tractor's order. The freeze will be lifted as soon as the assembly process is perfected, which our engineers expect to be within one month. I will then immediately fill your order in time for early spring sales.

Please feel free to give me a call at (417) 781-0156 if you have questions. I am sorry about the necessary delay and any inconvenience it may cause your firm, but this short wait before filling your request will assure you of our usual reliable product.

This audience model we have developed asks writers to articulate specific pre-writing content, arrangement and stylistic choices and understand the reasons for those choices, to ensure consicous planning of business messages. Such planning increases the likelihood of communication with the reader--the primary aim of effective business writing.

ANALYZING YOUR WRITING STYLE

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Having the ability to recognize and control your writing style is a mark of professionalism. In this workshop a technique for analyzing prose passages is introduced and applied to a selected sample from a user's manual. Directed by a chart, workshop participants analyze the sample's diction, punctuation, grammar, sentence structure, organization, and purpose. Examining the individual elements of the passage leads the group to a sense of the overall style of the writer. In the process, the characteristics of five common writing styles are presented. The "take-home message" is that there are aspects of every writer's prose that can be quantified and consciously manipulated to produce a corresponding change in writing style. Participants are encouraged to select a representative passage from one of their own recent drafts and to analyze it using the workshop technique.

INTRODUCTION

"Analysis," according to the *American Heritage Dictionary*, is "the separation of an intellectual or substantial whole into constituents for individual study"—that is, analysis is splitting a thing into its parts and looking at them closely. The "thing" for us is a small sample of prose, and the parts that interest us are its diction, puncuation, grammar, sentence structure, organization, and purpose.

There's merit in analyzing a prose sample because:

- You can measure certain characteristics of the sample *objectively.*
- You can get a sense of your writing style in the process.

"At the present time, we are discoursing rather formally. You know whereof we speak because of our diction." Looking at one of the parts—in this case, vocabulary—gives a sense of overall style.

There are as many writing styles as kissing styles. Some words to describe both: "inexperienced," "professional," "dry," "forceful," "lively." I leave out "technical"; the word deals with *content*—that is, an area of specialization—rather than with *style*—a way of describing subject matter.

The first step of this process, examining the parts of a short writing sample, involves about an hour of marking, counting, calculating, and filling out a chart (Figure 1). The second step, uncovering various features of the sample, enables you to generalize about the style.

THE WRITING SAMPLE

A writing sample from a computer user's manual is attached at the end of this paper.

When analyzing your own prose, photocopy a writing sample from the middle of a recent draft—a section that you've had time to polish—200-300 words long. The sample should consist totally of prose paragraphs, if possible. Graphics aspects of style, such as tables, equations, and diagrams, are beyond the scope of this paper. The piece should be double-spaced or triple-spaced and free of extraneous marks.

FILLING OUT THE CHART

Read over the chart to see what you'll be picking out. Then choose pencils and pens of several colors so that you can mark up and tabulate the writing sample easily. Finally, fill in the chart and figure the percentages as you go. (A handheld calculator will help.) The order that you complete the sections isn't important.

All compound and hyphenated words and all proper nouns count as one word on the chart. Examples: "may be damaged" counts as one verb; "pocket-sized" counts as one modifier; "Ford Foundation" counts as one noun.

The verb section will be the hardest. Quick review:

A *transitive active verb* takes an object. In the following, "you can see familiar key arrangements," the noun *arrangements* is the object of the active verb *can see*. Active verb constructions contrast with *passive* constructions in which the subject is acted upon; for example, in "familiar key arrangements can be seen," the noun *arrangements* is made the subject of the passive verb *can be seen*.

A *state-of-being* verb consists of one or more verb parts, the final part being a form of *to be*, e.g., "are," "was," "will be," "has been," "should be," and "may be." Note that "is using" and "may be seen" aren't state-of-being verbs because their final parts ("using" and "seen") aren't forms of *to be*.

THE CHART

Date of sample __________ . **Title** ______________________________ .
Today's date ______________ . Word count of sample (not including headings; numbers and compound words count as one) ______________ .

Diction
No. of monosyllablic words __________ . % of word count __________ .
No. of words of four or more syllables % of word count __________ .
(including compound and hyphenated words) __________ .
No. of *emphasized* or unusual words (italicized, quoted, slangy) __________ .
No. of contractions __________ .

Punctuation
No. of commas __________ . No. of semicolons __________ .
No. of dashes and pairs of parentheses __________ .
No. of question marks and exclamation marks __________ .

Grammar
No. of nouns (excluding gerunds and infinitives; compound nouns count as one) __________ . % of word count __________ .
No. of specific nouns, including proper nouns and part names ("backplane," "HP-85A," "interface loop") __________ . % of noun count __________ .
No. of specific, physical adjectives and adverbs ("left," "slowly") __________ .
No. of 1st-person singular references ("I," "me") __________ .
No. of 1st-person plural references ("we," "us") __________ .
No. of 2nd-person references ("you," "your") __________ .
No. of demonstrative pronouns ("this," "which," "that") __________ .
No. of verbs (compound verbs count as one; e.g., "may be damaged" counts as one) __________ .
No. of verbals (gerunds, infinitives, participles) __________ . Verbs and verbals % of word count __________ .

No. of transitive active verbs __________ . % of verbs __________ .
No. of transitive passive and state-of-being verbs __________ . % of verbs __________ .
No. of imperative verbs __________ .
No. of verbs in present tense __________ .

Sentence Structure
Word count of longest sentence __________ .
Word count of shortest sentence or sentence fragment __________ .
No. of sentence fragments __________ . % of sentences __________ .
No. of simple sentences __________ . % of sentences __________ .
No. of compound sentences __________ . % of sentences __________ .
No. of complex and compound/complex sentences __________ . % of sentences __________ .
No. of sentences that begin "It is," "It was," etc. __________ .
No. of parallel constructions __________ .
No. of sentences and fragments __________ . Average no. of words/sentence __________ .

Organization
No. of introductory words and phrases ("First," "Finally," "While you can...,") __________ .
No. of headings in sample __________ . Average no. of words between headings __________ .
No. of notes, explanatory footnotes, and parenthetical comments __________ .
No. of definitions __________ .
No. of examples __________ .
No. of analogies __________ .

Purposes *(There may be several in one selection.)*
__________ To describe the physical make-up of an object. ("The front panel on the printer contains several controls that...")
__________ To describe the operation of an object. ("This five-position switch controls the intensity or darkness or the printed characters.")
__________ To give explicit instructions to the user. ("Disconnect the recharger plug from the calculator.")
__________ To explain general concepts. ("The derivative is a function that describes the slope of a graph.")
__________ To market or write persuasively about a feature. ("One of the most advanced memory systems available in a scientific calculator...")
__________ Other.
Primary purpose of sample ______________________________ .

Figure 1. A Chart for Analyzing a Prose Sample.

Verbals are verbs that aren't used as verbs. There are three types: Gerunds and infinitives serve as nouns; participals, as adjectives. Example: "*Waking* [gerund] in the *broken* [participle] bed was an *unsettling* [participle] experience."

The definitions of sentence types for the sentence structure section are as follows:

Clause	Consists of a subject-verb nucleus.
Simple	Consists of a single independent (or main) clause.
Compound	Consists of two or more independent clauses.
Complex	Consists of one independent clause and one or more dependent (or subordinate) clauses.
Compound/complex	Consists of two or more independent clauses and one or more dependent clauses.

For the organization section, remember that a *parallel* construction involves two or more words, phrases, or clauses at the same level of generality. Examples: "red, white, and blue," "type the function name, enlcose the argument in parentheses, and press the (END LINE) key." Parallel elements are often joined by "and," "but," and "or."

The rest of the chart should be self-explanatory.

INTERPRETING THE CHART

Once you've finished the chart, note the items that seem characteristic or disproportionate. For example, you may notice that most sentences contain dependent clauses or that a particular word occurs repeatedly.

Look for patterns among the traits, perhaps drawing arrows to show relations. This is where analysis is replaced by induction as you generalize about the style of the sample.

Following are simplified descriptions of five common writing styles. Each has many variations; they're offered simply as guides.

Style	**Characteristics**
forceful	Imperative and active verbs. Simple sentences and sentence fragments. Specific, physical descriptions including many proper nouns and adjectives.
lively	Informal "you," present tense, "special effects" words and punctuation, dashes, hyphens, question and exclamation marks, a variety of typefaces, friendly tone; contractions. Varied sentence types and lengths. Use of contractions.
dry	Lengthy, compound/complex sentences with state-of-being verbs. Few transitive active verbs. No references to the author. Formal, Latinate diction. General rather than specific nouns.
professional	Obvious thought progressions in paragraphs. Clauses linked with introductory words and phrases. Parallel constructions extending through whole paragraphs. Concise use of jargon. Includes definitions, analogies, examples.
inexperienced	Many third-person pronouns, like "this" and "it." Switching from one verb tense or voice to another. Long, compound sentences strung together with coordinate conjunctions. Many parentheses and notes.

SAMPLE EVALUATION

The attached 204-word writing sample comes from the introduction to a personal computer owner's manual. Three characteristics predominate in the sample:

- Simple vocabulary. More than 60% of its words are monosyllables. Less than 5% (including compound nouns) contain 4 or more syllables.
- Informality. There are 11 "you"'s one "Gosh", one question mark, and one exclamation mark. Surprisingly absent are contractions. Most of its verbs are short, present tense, and active.
- Simple sentence structure. The average sentence length is about 17 words. Only one-third of the sentences have dependent clauses. In the first three sentences, there are five parallel constructions.

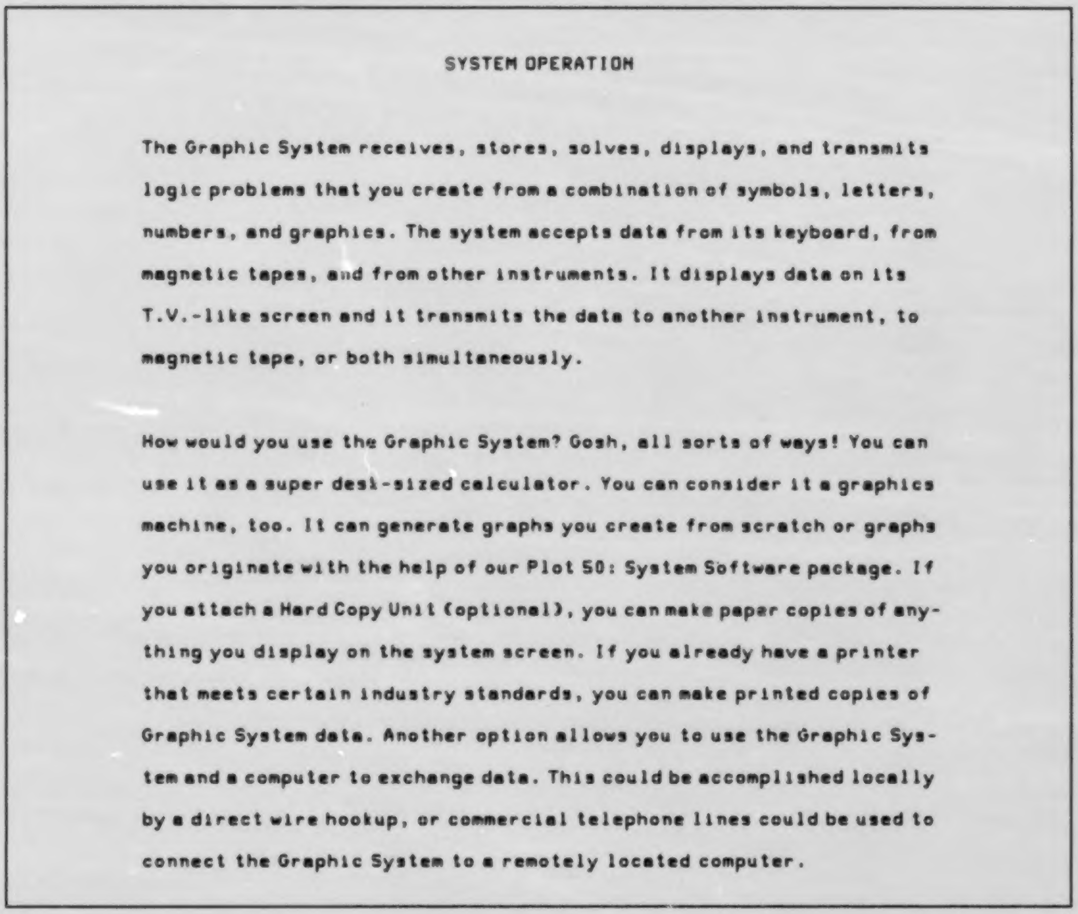
The simplicity of the sample is so pervasive that the sentences tend to read all the same, producing a certain monotony. The style seems "thin." On the other hand, the simple diction and straight-forward sentences make the sample readable and lively. Give the primary audience (programming novices) and purpose (to explain introductory concepts), we can say that the sample "works."

YOUR OWN STYLE

Generalizing about style is much more subjective than just filling out a chart. You may wish to look at a few samples from other writers to establish some reference points before you say, "Well, my writing is such-and-such." After you have noted some of your writing characteristics, you may feel the need to criticize them. However, before you pass judgment, ask yourself:

- Does the writing fit the subject? Although instructions can be skillfully—even gracefully—presented, you can't expect to write poetry about a disc drive.
- Does the writing fit the audience? Knowing who you're writing for, you can guess their reactions to your style.

If you do resolve to modify your style, decide which characteristics you're aiming for and deliberately write them into your prose.



SYSTEM OPERATION

The Graphic System receives, stores, solves, displays, and transmits logic problems that you create from a combination of symbols, letters, numbers, and graphics. The system accepts data from its keyboard, from magnetic tapes, and from other instruments. It displays data on its T.V.-like screen and it transmits the data to another instrument, to magnetic tape, or both simultaneously.

How would you use the Graphic System? Gosh, all sorts of ways! You can use it as a super desk-sized calculator. You can consider it a graphics machine, too. It can generate graphs you create from scratch or graphs you originate with the help of our Plot 50: System Software package. If you attach a Hard Copy Unit (optional), you can make paper copies of anything you display on the system screen. If you already have a printer that meets certain industry standards, you can make printed copies of Graphic System data. Another option allows you to use the Graphic System and a computer to exchange data. This could be accomplished locally by a direct wire hookup, or commercial telephone lines could be used to connect the Graphic System to a remotely located computer.

Figure 2. Writing Sample

PROBLEMS FACING WRITERS OF SCIENTIFIC AND TECHNICAL COMMUNICATIONS IN DEVELOPING COUNTRIES

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Knowledge cannot and must not be restricted by international boundaries and consequently freedom of speech should be encouraged and assisted in every possible manner.

The writers in developing countries face numerous problems. The biggest of them is the paucity of funds for experimentation, for books/journals and for typing and mailing charges. An International Organization should impress upon all the developing countries for adequate funds to their writers. Various agencies (whether already in existence or newly set-up) of developed countries should award grants to writers from developing countries. Each developed country must adopt one or more developing country for this purpose.

The writers from developing countries neither have access to most of the international journals nor they have facilities/funds for getting xerox copies of the required articles. As compared to those from developed countries, writers from developing countries are generally late in asking for required reprints because they neither have a ready access to the abstracting journals nor to the CURRENT CONTENTS. The result is that reprints get exhausted and writers from developing countries are left high and dry. Such reprint-requests cannot get any priority even on humanitarian grounds because reprints are supplied on first-come, first-served basis. I feel that by spending a little amount, authors of developed countries can help such writers by supplying them xerox copies.

KEYWORDS: Developed countries, developing countries, funds for writers, xerox copies of reprints.

Knowledge cannot and must not be restricted by international boundaries. There should be a free exchange of ideas and thoughts among individuals of different countries. A writer should be able to break all the international boundaries and reach writers and readers of other nationalities. This freedom of speech should be encouraged and assisted in every possible manner.

The writers in a developing country face a number of hurdles in the pursuit of knowledge and also in the dissemination of their ideas. It is very likely that a writer from a developed country cannot even imagine the appalling conditions under which his counterpart has to work in a developing country. More important of these problems being faced by writers in developing countries may be listed as follows:

1. PAUCITY OF FUNDS

The biggest hurdle for a writer from a developing country is the lack of adequate funds. This hinders his work to such an extent that many-a-time, he becomes totally frustrated and disillusioned so much so that he may altogether stop communicating his thoughts to others. There are neither funds nor facilities for conducting the required experiments to solve a problem. Sometimes he does not have even petty amounts for getting his manuscript typed from a professional as the typist, he may have in his own organization, is usually too shabby. He generally does not have funds for mailing his manuscript to the editor/publisher or his reprints to those who request for the same. This problem of lack of funds may be tackled to some extent by an International Organization which may recommend and insist upon all the developing countries for providing adequate funds to their writers. There should also be greater cooperation between developing and developed countries in the form of small grants to such individuals of the developing countries from agencies (whether already in existence or specially set-up for this purpose) of the developed countries. In many U.S. Universities, new foreign students are adopted by families who act as their foster families. Similarly, each developed country must adopt one or more developing country and help the latter's writers.

2. REPRINT DISTRIBUTION TO WRITERS

Another very serious problem facing a writer in a developing country is the non-availability of pertinent literature. Such a writer has meagre resources for books and journals. Theoretically, one can request for reprints of all the articles in which one is interested. Rao (1971) has drawn the attention of international community of writers to the pathetic condition of writers in India, a developing country, with respect to the difficulties faced by them in this respect. I fully agree with Rao (1971) that the situation is thoroughly discouraging because generally Indian researchers neither receive the required reprints, nor they have any facility for xerox copying nor have they any access to most of the journals. Further, even some of the better-established and relatively older Indian universities receive neither BIOL. ABSTR., CHEM. ABSTR., etc. nor CURRENT CONTENTS. More or less, the same situation may be prevalent in all other developing countries. On the other hand, some individual researchers in developed countries get their personal copies of CURRENT CONTENTS. Hence, one can imagine the odds under which a researcher from a developing country has to work in competition with fellow researchers from developed countries. This drastically reduces the efficiency of researchers of developing countries in producing a good piece of research/article. Further, the position regarding the availability of literature to an average Indian researcher is even worse than that depicted by Rao (1971) and the situation has further worsened during the past one decade. On an average, an Indian University does not receive more than a score or so international journals in all the branches of science. Similar situation should be obtaining with respect to journals in humanities and social sciences. The position is even more acute in Indian colleges. I am afraid, similar conditions exist in other developing countries.

To remedy this situation, Rao (1971) has suggested that reprint-requests from developing countries should be given priority over those received from developed countries. However, I feel that Rao's (1971) suggestion is not practical. Rao (1971) herself has admitted that many of the foreign journals are not within the reach of Indian researchers and hence Indians, and for that matter researchers from other developing countries, get late in asking for reprints as compared to those from developing countries. Naturally, authors cannot give priority to requests from developing countries because reprints are supplied on first-come, first-served basis. Instead, I suggest that authors from developed countries should try to fulfil the reprint-requests from developing countries, even after they have exhausted their supply of reprints, by providing xerox copies. However, let me also warn reprint-hunters that one must ask only for those reprints which are a must for him/her and which are published in journals not available in his/her institution. Hartree (1973) also feels that many of the reprint-hunters already have an access to the requested reprints.

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Transferring Technology to Developing Countries: Crossing the Language Barrier

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Transferring technology to developing countries requires a sensitivity to culture, values, and language. "Controlled" English and effective translation are two strategies for crossing the language barrier. "Controlled" English facilitates the publication of certain kinds of technical writing in English for international audiences. It does this essentially by limiting the range of vocabulary and restricting the complexity of sentence structures. Effective translating can minimize the transmittal distortions and reach large audiences without having to teach them a foreign language. To create imaginative and sensitive translations we should train technical translators, verify and clarify the information, do a thorough terminology search for novel and non-equivalent terms, and get the companies as well as the audiences involved in the process.

INTRODUCTION

As keynote speaker at the 29th ITCC, Andrew Hugessen, observed: "There are barriers of culture, language and custom to the transfer of technology. We must find ways to communicate, not just skills, but information and attitudes across these barriers." This paper proposes two strategies for surmounting the language barrier: (1) the use of "controlled" English and (2) imaginative and sensitive translation.

CONTROLLED ENGLISH

"Controlled" English, according to Dr. John Kirkman of the University of Wales Institute of Science and Technology , is a version of English adapted to target audiences in countries which do not speak English. It deliberately limits the range of vocabulary as well as the complexity of sentence structures used in technical documents. (1)

"Controlled" English, designed for non-native speakers of English and those who speak no English, eliminates the ambiguity of the language which results from the use of auxiliary verbs, synonyms, idioms and complex sentence structures. It does this by observing these guidelines:

- Restricting the variety of words
- Ensuring that each word has only one meaning
- Avoiding synonyms
- Keeping the number of verbs to a minimum
- Repeating concepts rather than referring back
- Reducing past/future verb constructions by clearly sequencing steps
- Restricting writing to four types of sentence structure:
  1. Statements, descriptions, or explanations;
  2. Instructions of commands;
  3. Combinations of conditions with either descriptions or instructions;
  4. Questions.
- Avoiding heavily qualified statements.
- Constructing questions clearly. (1)

Originally conceived by the Caterpillar Tractor Company, which markets heavy machinery and earth moving equipment in a multitude of developing countries, "controlled" English permits the publishing of operator and repair manuals in one language, thus saving a company millions of dollars for the cost of publishing translations in many languages. Caterpillar's version has a vocabulary of 784 words and is now marketed "as ILSAM--International Language for Service and Maintenance--by M. and E. White Consultants (world-wide agents) and as Basic 800 by Smart Communications Inc." (1)

Advantages and Disadvantages

Dr. Kirkman in his book Good Style for Scientific and Engineering Writing points to the advantages and disadvantages of "controlled" English. It is ideal for applied writing contexts. Instructions, repair manuals, operating instructions, etc., adapt well to versions of "controlled" English. It is inadequate, however, for "theoretical discussions, arguments about data, or ... abstract analyses." (1) The complexity of these writing genres require a broader range of English.

"Controlled" English then adapts well to the transfer of technology on the applied "nuts and bolts" level rather than the academic or theoretic level. And since this is the proving ground of all technology transfer, the use of "controlled" English to surmount the language barrier deserves serious consideration.

Of course, limiting the complexity of vocabulary and structures will not, by itself, achieve results. This technique must be combined with practicing other principles of technical communication. Careful analysis of the "target audience" is essential to avoid obfuscation and offensive terms or symbols. Page layout featuring bold print, well resolved graphics and complementary whitespace will enhance the communicative power of finely tuned English.

Target Audiences

Technical communicators writing for international audiences must target their audiences as accurately as they refine their language. Dr. Kirkman has classified international readers of English in 3 categories:

- Expert readers
- Students of English
- Readers who do not understand English

Expert readers are people who read international publications about science and technology, who work with sophisticated equipment which is marketed internationally and those who engage in international commerce. (1) For those readers who understand the "established core of specialist vocabulary," the difficulty of reading English derives mainly from "complexities of sentence structure" and "verb forms" unfamiliar to non-native speakers. (1) "Controlled" English, by limiting complexities and simplifying statements, can increase comprehension on the expert level.

Students, as an audience, comprise readers who are learning the English language or who study "commercial, scientific or technical subjects" in English. Such readers, says Dr. Kirkman, require lucid definitions and explanations. When writing to this group, the communicator can assume specialist knowledge, but must take great care to "control carefully the complexity of structures created." (1)

Readers who understand no English compose an audience needing the greatest restriction and control of language complexity. However, Caterpillar has found that this audience, after a 30-60 hour training session with a bilingual instructor, can comprehend information written in "controlled" English. About the training program, Dr. Kirkman observes,

> ...a bilingual instructor helps the operators to recognize and understand the significance of the limited vocabulary and the limited range of patterns. He gives definitions and explanations in the native language. But at no point is the learner required to speak or write English. (1)

The effectiveness of instructions or manuals written in "controlled" English can be enhanced by presenting the training session in a realistic context. Operators are more likely to retain technical information if it is presented in the environment where it will be used. (2) Consequently, companies which transmit information to users in "controlled" English should establish bilingual training sessions at the work site or in an environment which simulates it.

"Controlled" English by its application to international scientific and technical communication can save money because it precludes the publication of documents in multiple languages. It does have limitations, however, in that it can be used only to communicate applied technology and it requires careful preparation of the audience. In lieu of "controlled" English companies may find it essential to publish in judicious and accurate translations.

TRANSLATIONS

In the event the use of the concept of "controlled" English is not practical or not advisable, the second way of overcoming communication barriers, created in transferring technology to developing countries, can be achieved through imaginative and sensitive translating. Properly translated, a text can become a human link between different mentalities and even social systems.

It is not necessary to translate texts into all possible languages of the developing nations. Doing it can prove very costly, time consuming, and it can create communication problems because of the lack of expert translators. Therefore, the translating can be limited to the officially recognized scientific and technical languages. According to the United Nations English, French, Spanish, Russian, and Chinese are such languages today. Portuguese, German, and one African language (like Swahili) can be useful too. (3)

Technical Translation

U.N. agencies and larger commercial concerns generally prefer a graduate in arts, who is a trained linguist with a degree in translation, over a technical specialist, who knows a foreign language. The linguist has a wider culture and is more experienced in purely linguistic techniques, semantics, lexicography, etc. "It was found that in a field other than his own, the technical expert was often just as much at sea as the arts specialist, without having the latter's linguistic 'know-how.'" (3) Technical expertise is of course invaluable for the technical translator. It is good for the translator to have, however, gained directly or through osmosis , an insight into actual industrial and scientific processes, tools and techniques as well as specialized vocabulary, because he knows the subject at first hand and shows no hesitation in writing reports or abstracts instead of sticking to a purely verbatim translation.

A good translator should be able to do free translation, which involves shortening the text, removing superfluous remarks, using his judgment to improve the clarity of the text, rearranging of the structural elements of the sentence, such as clauses, in order to make the target language (language he translates into) read properly and clearly as against the literal translation. (4) In other words, he has to know what he is talking about.

Common Problems

Transmittal Distortions. Distortions occur whenever information is transmitted from one person to another through a third person because each of us is likely to receive, perceive, and transmit the same information somewhat differently. When two languages are involved, such distortion is augmented because phrasing may vary, word equivalents may not exist, the same word may have different connotations. Even the best translations can only be close approximations of the message. (5) Besides, written communication lacks nonverbal elements (like gestures, facial expressions, etc.) that can enhance comprehension of the text.

Untrained Translators. Firstly, being bilingual doesn't automatically qualify a person to be a translator. Without the thorough knowledge of cultural beliefs, social mores, religion, etc., a translator may impose his personal beliefs on the readers., causing misunderstandings and creating possible negative attitudes toward the subject. Secondly, many translators might not understand technical terminology, or the significance of the information they are translating. The result may be inadequate or inaccurate translation, as in a case of one company that makes railroad brake systems. The company hired professional translators to prepare a manual in Spanish. The results were embarassing because of the amateurishness of the brochure. This illustrated what the manager of the Advertising and Publication Department of that company called a total lack of knowledge of "railroad" Spanish on the part of the translator.

Solutions

Verification of Translations. Translators should verify their information with the native speakers of the target language who are also the subject experts in the given technical field.

Style and Format of Translation. Translators should write in short sentences, and repeat important messages. They should use visuals whenever possible. They may use microcomputers and word processors to aid them in the process.

Company's Involvement. The companies in need of translators may:

* Hire a full-time trained medical, technical, or scientific translator if possible;

* Devise an inhouse program to teach medical, technical, or scientific terminology to general translators, making them aware of:

--different levels within each language: technical, standard, slang (example: technical--mucociliary blanket, standard--mucus, slang--spit);

--different meanings of one word depending on the context in which it is used--specialized use of vocabulary (example: bias -1. prejudice--common usage, 2. voltage applied to a device to establish a reference level for operation--physics, 3. a line diagonal to the grain of fabric--garment industry);

It is imperative to remember that in the case of using general translators, they should work closely with the subject experts to obtain clarifications and verifications. The company that uses translators should be aware of the kinds of problems translators have, as well as what to expect from them. Only then they can provide the kind of assistance the translator needs to translate effectively. (6)

* Train technical personnel to translate. This might prove to be very difficult because of the lack of proper linguistic training on the part of the subject expert. It is possible that a subject expert can mistake a Spanish word "constipacion," which means nasal congestion, for "constipation," which is intestinal, because of the visual similarity between the terms.

* Help the translators to meet with the group(s) for whom the translation is done so that they can determine attitudes toward subject matter, their self image, state of mind, situations in which the translation will be used, and so on. This will allow the translator to write at a proper social/intellectual level at which the language is placed. He will avoid literal translations which may be very dangerous. For example, the statement, "Tengo una bola en el tragaders," literally means, "I have a ball in the swallowing pipe," which means, "I have a growth in the esophagus." (6)

Terminology Research

Experienced translators know how important a good technical dictionary can be, but they also know that they can't rely on dictionaries only. They know how to research terms, especially novel or non-equivalent terminology. The process of terminology research consists of three stages:

1. Finding materials that show the term in context;
2. Finding materials that are reliable (untranslated, originally composed texts in the target language by native-speaking subject experts). The terms have to be acceptable within the target language and within the specialized subject field of the translators;
3. Double-checking from various sources (avoiding inhouse, non-standard use of terms to prevent picking up terminology specific to only one company).

The sources for terminology research can be scientific and technical journals, industrial trade journals, patents, trade fair catalogs, proposals, specification sheets, and others. (7)

CONCLUSION

Any approach to crossing the language barriers requires a knowledge of the culture and a sensitivity to the values of the country's citizens. With this kind of awareness technical writers may practice "controlled" English and/or effective translation to minimize the communication problems in transferring technology to developing countries.

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Translation
Telling the World about Your Products

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As your company moves its products into the international marketplace, deciding whether to translate product literature and support documentation is an important issue. Your decision about translation won't be a simple one, particularly if you are introducing a new product worldwide.

France leads the way in setting language requirements for product support documentation. By law, all equipment sold in France must include French operating instructions. Other countries may soon adopt similar laws.

But legal requirements are not the only consideration. Your sales representatives need to cultivate an identity that is closely associated with their sales territory. Providing product information in the customer's language helps compete with manufacturers in the target country and demonstrates a dedication to product support.

There are three ways to translate your text: use a translation service; bring a translator into your home office; or go to a translator that is located in the target country. Each has advantages and disadvantages that you must consider before making a choice.

When translating, there are guidelines for writing, art, photography, and printing that can save time and money. Choose words that are clear and concise. Also, consider copy length; translated versions may be 20 percent longer than the U.S. version. Some art techniques that are effective in U.S. publications are not easily adaptable to translation. Photographs may require different models and props for each language. With good planning, the U.S. version and all translations may be printed at the same time, thereby taking advantage of reduced makeready costs and significant cost savings on longer press runs.

If translation is important to the success of your products, you should examine the issues and study the guidelines presented in this paper.

"...fully 79% of all manufacturing jobs created in the U.S. between 1977 and 1980 were linked to exports." This staggering percentage quoted from an article on transnational planning in *Advertising Age* (December 6, 1982) should be a clear indicator to technical communicators that the international marketplace cannot be ignored. This marketplace is growing and as it grows communicators must be prepared to meet the needs of audiences all around the world. This paper does not attempt to tell you the "rights" and "wrongs" of preparing product literature and support documentation for translation. It only raises a few questions that you must answer and gives you some alternatives from which you can choose. The guidelines that are included in the last section are intended to give you some ideas that you can adapt to your strategy for telling the world about your products.

THE FIRST STEPS

Getting a good definition of the audience is the first big barrier to clear communication that you must overcome. As a writer or artist, you're further removed from your audience than ever before. You no longer share the same language or similar cultural background. There are new questions about your audience that you must answer: Is English a second language? What kind of support will be available locally for this customer? When and how will the customer receive the translated literature and support documentation? What is the level of literacy for the target customer? What background knowledge does this customer have?

Then you must decide just what needs to be translated. Do you translate your data sheets, brochures, direct mail pieces, point-of-distribution materials, operating manuals, or service manuals? Does translation mean that you should reevaluate your product literature and support documentation, maybe reorganizing your existing literature? What will be most cost effective and still ensure that the customer receives the information that is needed?

Now that you know who your audience is and what you want to translate, it's time to choose the languages that are best for your customers. You may find that you won't need a separate translation for each country in which you sell your product. You may be able to choose three or four languages, such as German, French, Spanish, and Japanese, that will fill your need for translation in all of your target countries. Factors that will help you decide which languages to choose are included in the sections INTERNATIONAL REGULATIONS and ESTABLISHING A LOCAL IMAGE.

INTERNATIONAL REGULATIONS

When you've decided in which countries you will market your product, get up-to-date legal advice about language requirements. Some countries, such as France, have strict regulations about translation for product literature and support documentation. By law, all equipment sold in France must include French operating instructions. In other countries, such as Germany, there is no law requiring translation; but in order to get safety approvals, operating instructions, warnings, and cautions must be translated.

The regulations that you encounter in the international marketplace may influence decisions affecting all of your company's publications. For example, you may choose to omit prices from data sheets or to run two versions, one with prices and one without, because of fluctuating exchange rates. Or, you may decide to reorganize your manuals so that all operating instructions and safety information are included in a separate publication that can be translated and printed more quickly and economically than your existing manuals.

These regulations may also influence the method you use in getting your text translated. In France, a government agency called the French Academy (Academie Francaise) is concerned with keeping the French language pure. It publishes a list of technical terms that must be used in French translation. For instance, "logic analyzer" is commonly recognized by technicians in all languages but the academy requires "analyseur numerique." Regulations such as these may be good reason to have your translation done in the target country.

ESTABLISHING A LOCAL IMAGE

As your product moves into the international market, product identity becomes important. Do you want your customer to think of your product as a U.S. product? Will you be competing with products that may be preferred because they are manufactured by a company located in the target country? How do you indicate that you will give good product support although your product is not produced in the target country?

To create the image that you are looking for, especially in product literature, you may have to do more than translate the text. It might be necessary to change your photographs to fit the country where you will sell your product, which means different models and different props. You might consider printing your translated literature on paper that is a standard international size. Providing the customer with good product literature and support documentation in the local language helps create a successful product image. You demonstrate a willingness to meet the needs of your customer and a dedication to product support.

PLANNING FOR TRANSLATION

When planning for translation, you have three strategies from which to choose. You may decide to use one strategy for product literature and another for support documentation or you may choose the same strategy for all types of publications. Your choices are to:

- Develop publications that can be used almost anywhere in the world with language translation only.
- Develop publications that can be used in other countries with language translation and some minor changes, such as new photographs.
- Develop publications from scratch for each target country.

After you've decided which strategy you'll use, you must decide how you will get your text translated. There are three ways to translate text: use a translation service; bring a translator into your home office; or go to a translator that is located in the target country. When you are ready to make this decision, do some investigation into each, asking yourself questions like these: Have others in my company already used a translator that might also be appropriate for my publication? Which method is most cost effective in this situation? How will communications with the translator be handled? Which languages will be used and can the same method be used for each of those languages? Which method will provide a complete translation by the deadline?

The time required for translation depends on your strategy and method of translation. Don't expect to add translation at the last minute and still get it done on time. Translation must be planned as part of the publication cycle from the first day of the project. As you are developing your schedule for research, writing, production, and printing, talk to those people who will be working with the translation. Be sure that everyone understands the steps in the process and who will do what. Discuss the time it will take to complete each step. Draw up a timetable and keep the translator informed of any delays in schedules.

GUIDELINES FOR WRITING AND PRODUCTION

These guidelines assume that you are using the first or second translation strategy. With these guidelines, your goal is to work efficiently, making decisions that will be effective in the English versions and in the translations. They will help you minimize the changes required for your translated publications and assure that all versions are similar in appearance.

Writing

As you develop the text for a publication, keep translation in mind from the beginning. You can avoid many problems and save editing time. Each time you make a decision, consider the implications of translation. But use caution here; don't make writing decisions based on translation alone. Choose the alternative that will make translation as easy as possible, but don't compromise the English version of your publication. In practice, you'll find that this approach actually improves your translated versions. Other guidelines that you may find helpful follow.

- Decide whether words are necessary. Some procedures may only require simple step-by-step illustrations.
- Use the writing techniques that are effective in English: active voice; simple, concise words; short sentences and paragraphs; definitions for unfamiliar terms; consistent use of terms.
- Use simple, brief examples. Avoid examples that are unique to the U.S.
- Avoid acronyms, abbreviations, and cliches.
- Avoid claims such as "fastest," unless you are sure the statements are true when you compare your product to worldwide competition.

- Be aware that some changes may be necessary if your publication is going to an English-speaking country other than the U.S. For example, in Europe a comma is used to separate a decimal from the whole number and the period is used to separate the denominations of large numbers. Dates are noted by day, month, and year instead of month, day and year. Many words may need to be spelled in the preferred European spellings, such as "metre" instead of "meter."
- Use generic names when possible. Trademark names with literal translations can cause confusion when translated and trademark products may not be available in target countries.
- Consider the length of your text. When translated, it may grow as much as 20 percent.
- Avoid making changes to text after it is sent for translation. Try to anticipate changes that may occur; if changes are likely to be made, warn the translator. Remember that when text is being translated each change must be made in every translated version. One simple change may become many changes.

Layout

There are two options from which to choose when deciding on a layout for an international publication. Your choice will depend on the purpose of the document and on your budget.

You can prepare a multilingual document which includes English and your target languages. A multilingual document is most appropriate for support documentation, such as manuals or instruction sheets. If you have just a few languages, you can put them side by side on a page. One set of photos or diagrams then serves each language. If you're using many languages and your budget restricts you to one set of photos or diagrams, put the art on a flap where it can be seen regardless of the language being read.

Your other option is to prepare individual versions of the document in each language. This approach is effective for product literature, such as data sheets and brochures, because single-language documents convey your message more personally than multilingual documents.

Whichever option you choose, leave room for expansion of your target languages. Translated text may require up to 20 percent more space than the English version. Remember this expansion factor as well when you put text in a confined area, such as a chart or block diagram; unless there's room to expand, translated text may not fit in the prepared artwork without reducing type size.

Include a copy of the layout when you send your text for translation. The translator can judge whether there are too many words for the available space, and if necessary, rewrite or edit before the deadline.

Art

With careful planning, the same artwork can be used in each translated version. But you may have to avoid or modify some art techniques which are effective in single-language publications, such as the ones that follow.

- Reversed type — Avoid using reversed type on multicolor or four-color process backgrounds. If you choose to reverse type in headlines or text, you'll have to remake negatives and/or printing plates for the translated versions. This takes time and adds to the cost. It's most efficient to print black text over light colored backgrounds so that only the black plate is affected by translation.
- Bleeds — If you plan to use different paper sizes (English 8½ by 11 in. and international 210 by 297 mm), avoid the use of bleeds.
- Callouts — Instead of callouts on line art, use code numbers or letters, then reference them in the text. If you decide to use callouts, place them so that they can be overlaid by translated callouts, but remember the 20 percent expansion factor.
- Colored lines — Avoid colored lines that underscore a headline or subhead. Translated headlines will rarely be the same length as the English, so the color plate(s) will need alteration.

Photography

It's a straightforward task to plan, stage, and take photos for a U.S. audience because you understand how your product is used in this country. However, when shooting for a multinational audience, decisions about models and props require knowledge of how and by whom your product is used in the target countries. Mistakes will distract from your message.

Make sure that your models add to your message. Consider using sets of models representative of your target countries for each shot: one group for the U.S., one for Europe, one for Japan, etc. Find out about typical male/female working relationships in the target countries so that you can avoid mistakes, such as portraying a female in a traditionally male role. And learn about local sensitivities. For example, the U.S. work force includes many minority groups, but this is not the case in Europe. Therefore, one photo with male, female, and minority models would seem natural in the U.S., but contrived to a European audience. Be sure the models are dressed appropriately; avoid plaid suits, loud shirts, and trendy styles. In Europe, long sleeve shirts are more conventional than short sleeve shirts, and ties are common. Watch footware, too; you don't want a cowboy boot to upstage your product.

If you don't have the time or resources to learn about how models should be used, it's better not to use them at all. You can stage effective photographs that suggest human presence without models. Then your decisions focus on what props to use.

When selecting props, watch for two things: words that need translation, and the appropriateness of the prop in your target countries. When you use props, such as computer printouts, CRTs, memos, graphs, or overhead transparencies, try to make them language-independent. If language is essential for understanding (and if it will be readable in the photograph), prepare translated versions before the photo session. Also, avoid the use of calendars, posters, and other nonessential props with words. Remember that objects which are common in U.S. offices and homes may be exotic in other countries. Be careful when using props like the following.

- Potted plants — Don't use too many and watch the species; tropical plants are uncommon in international offices.

- Phones — Pushbutton or brightly-colored phones are unusual in most countries.
- Chairs — Use chairs with five-star bases when shooting photos for Germany; four-star bases do not pass German safety codes.

Printing

If you have a choice of printing all translations at one time or printing separately in each target country, consider the lead time required for each option, the adequacy of printing facilities in each country, and your distribution plans for the publications.

Printing all versions at one time in the U.S. gives you more control over the product and takes advantage of reduced makeready costs and significant cost savings on longer press runs. It requires that all translations meet your deadline. If one language is late, all others could be delayed. And after printing, you may have tons of paper to send overseas.

If you print each version in the target country, the distribution line is shorter and less lead time is required because countries can translate and typeset while production proceeds for the English version. Printing in each target country is more expensive than a single printing because much work is duplicated, such as makeready on the press. Short press runs also increase costs. To reduce some of these costs, send each country duplicate separations of the final film (ready for platemaking) and any photographs or color transparencies taken especially for that country. Also, if your English version has been run, send an uncut pressproof of that English version; the color scale test will help printers in target countries.

CONCLUSION

Translation is not a simple process. It takes work, but there is one key to successful translation: planning. With good planning through each step of the publication process, it is possible to have translations that are more than text in the target language. You will have clear communications that tell the world about your product.

PANEL

NEED TO KNOW: THE WAY TO GO CASE STUDIES IN TASK ANALYSIS

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Information has become an important part of every product in today's market. The information may be very simple, such as the price on a package of meat or the washing instructions on a new sweater, or very complex, such as the assembly instructions for a ten-speed bicycle or the set-up instructions for a large piece of computer equipment.

We have come to depend upon the transfer of information. As users, our needs for information center around two questions:

- *What do we need to do (the task)?*
- *What do we need to know to do it?*

This panel presents three case studies in the use of task analysis to define the information that we need to know *in order to do something—buy meat, wash a sweater, assemble a bicycle, or set up computer equipment.*

This panel is part of the total presentation on task analysis entitled "Need to Know: The Way to Go". *The related workshop and poster are described in more detail elsewhere in your* Proceedings.

CASE STUDY 1:
Carving the Peg to Fit The Hole

Robert Ward presents a method for using task analysis to solve an information problem. The method involves analyzing not only the task the user performs, but also the characteristics of that user. Without this double focus, the audience probably will not be able to use the information to perform the task. Thus, seemingly good information can result in a square peg for a round hole—unusable information.

Documentation that combines task analysis with an analysis of the audience creates the proper round peg for the round hole. The problem is solved by providing information that a user needs to know in a form that is useful.

CASE STUDY 2:
Bringing Task Analysis to the People Who Need It—Writers!

In her paper, Georgiana Mitchell explains a writer's use of task analysis throughout all phases of the publication's development—planning, research, writing, and formatting. The result is a manual that is complete and easy to use.

The methodology is simple, but technical communicators encounter many obstacles to producing good user manuals. This paper presents hints for overcoming these obstacles.

CASE STUDY 3:
Defining a Computer System's User Interface via Scenarios—A Methodological Cookbook

Allan Henderson's paper suggests that a computer's user interface is information—keyboards, displays, messages, and manuals. He develops a five-step methodology for defining this user interface with scenarios.

A scenario describes the precise steps that a user must do to complete a task. The scenario methodology starts with a definition of system users and the needs of these users. A collection of scenarios then defines all the tasks that will be done with the computer system—that is, the collection defines the user interface of the computer system.

WORKSHOP
Need to Know: The Way to Go

Following the panel presentations is a workshop on the same theme. In the workshop, participants will be guided through several experiences with task-analysis methodology. These experiences, although short and fun, give participants first-hand experience in applying the ideas presented by the panel members.

The case studies in task analysis describe a first step toward developing good user information. The workshop experiences develop a deeper awareness of why the *need to know* is *the way to go*.

Check your program schedule for the time and place of the workshop.

POSTER
Need to Know: The Way to Go

As technical writers, we often think only of the print medium as the way information is transferred. But, as Allan Henderson points out, there are many other media by which we receive information.

To this end, Allan Edmands has created a mixed-media poster that highlights the main ideas of the panel and the workshop. Ths poster also lists the time and place for the panel and for the workshop.

Stop by the main display area and see this use of mixed media. The poster is an example of transferring information that you *need to know*.

NEED TO KNOW:
BRINGING TASK ANALYSIS TO THE PEOPLE WHO NEED IT—WRITERS!

Georgiana E. Mitchell
International Business Machine Corporation

Georgiana E. Mitchell
International Business Machines
Corporation
Graphics Systems Programs
Senior Assoicate Information Developer
Kingston, New York 12401

- Speaker at 29th ITCC, 1982

Stop! Read this paper if you want to write better manuals.

Understanding task analysis will help you write better manuals for your customers. This paper introduces you to task analysis. The concept is very simple:

- *Look at the product you are documenting in terms of the tasks (jobs) the customers must perform.*
- *Document only the information required to perform the task.*
- *Package it in a form appropriate for the task.*

My experience developing a user's guide for a new software product taught me techniques that will help other writers develop task-oriented manuals for new product libraries.

WHAT IS TASK ANALYSIS?

Task analysis is an approach to designing documentation for customers. It is based on the idea that documentation for new products should be organized by discrete jobs (tasks) the customer must perform to use the product. For example, some of the tasks that may be documented are product evaluation, installation, customization, planning, end use, and problem diagnosis.

The approach is very simple:

1. Look at the product you are documenting in terms of the task (jobs) the customers must perform.
2. Document only the information required to perform the tasks.
3. Package it in a form appropriate for the task.

Task-oriented libraries work especially well for customers who are not computer sophisticated or don't have the time to learn large amounts of new information. The user reaches for the manual that will help accomplish a specific task. That manual contains only the information the user needs to do the job, no more no less. For a particular product the same person may perform more than one of the tasks to use the product. In that case, more than one task can be packaged in a manual (for example, *Network Routing Facility Installation, Resource Definition, and Customization*).

WHO DOES IT?

Information planners must determine what the set of tasks are for each new product and present this information along with a description of the audience in an information plan. The information plan is used by the writers, who decide how to package the information for the tasks and write the manuals.

Task-analysis also enhances the job of the writer. It requires the writer to learn about the customer's job in addition to learning about the product. Rather than writing manuals that merely describe the specifications of the product, the writer explains how to do things with it from the user's point of view. Task-oriented library design assumes that, if you, the writer, know how a customer will use your product, you can give that person complete information in the most usable form.

Because the type of information a writer gathers for task-oriented manuals differs from information for product-oriented manuals, the method used to collect the information is different as well. The writer must "become" the customer in order to gather source material. The writer acts as the agent for the customer and must keep the customer's needs paramount. The writer does not learn the information as a new programmer or engineer might. Instead, the writer interviews the technical people on a project to get answers to the questions customers will have.

HOW DO YOU DO IT?

My experience in developing a user's guide for a new software product taught me techniques that will help other writers develop task-oriented manuals for new product libraries. Most writers encounter some of the following problems during the development of customer information.

- Product designers and developers don't always think about the system, program, or machine from a user's point of view.
- The product specifications are not written or organized according to tasks.
- Additional information that you need is not written down.
- There is not enough time in your schedule to conduct a survey of typical users.
- The product changes.
- It is difficult for you to get machine time to develop your information.
- You are not able to accomplish as much user testing as you would have liked.

Using the task analysis method can help you circumvent some of these typical obstacles.

An Example

I was assigned to write a user's guide for a new software product. This product would allow nontechnical users (secretaries and managers) to create color displays on a CRT. The manager (or secretary) would enter the words in a special area on the screen and then select color and type font options for each line from a table on the screen. When the user pushed a designated key, the work screen would disappear and the panel they designed would form on the screen. The displays would contain business information presented graphically. These displays could then be photographed and used in presentations.

My objective was to introduce the new product, all its functions, in a series of lessons. At the completion of the training session the user would have used every major function and been introduced to the minor ones. Each lesson was designed to:

- State at the beginning what the user was supposed to accomplish in that lesson.
- Be of an appropriate length to not conflict with the normal rhythm of the user's day.
- Increase in complexity until the lesson matched a typical use of the product.
- Use tested examples and graphics to illustrate or reinforce the lesson.
- Introduce all new terminology; use analogies and metaphors to explain abstract terms.

The techniques I used to help me achieve my objectives for this manual address every phase of the information development process.

1. Planning
2. Research
3. Writing
4. Formatting

Planning

- Read the description of the task in the information plan. Get copies of other manuals that document the same task. For example, I got copies of user manuals for text processing systems. They addressed the same audience and used a lesson format.
- Develop a "bare bones" basic manual outline based on the task described in the information plan and the way the information is organized in similar manuals.

Research

- Observe typical users performing similar tasks. For example, I noticed that both secretaries and managers are interrupted frequently and would have difficulty completing lessons that were more than two or three pages in length at a time.
- Develop a set of assumptions about how the audience performs the task. Review your assumptions with typical users.
- Use the product yourself or ask your technical contact to give you demonstrations. Develop a description of the interface. Your description will help you make decisions about how to format the manual. For example, I decided to use pictures of the panels in the manual to reinforce the instructions and verify the results.
- Read the product specifications; pay special attention to any sections that seem to require action on the part of someone.
- Develop a set of questions for your technical contacts based on what you read in the specifications and what you observed in the demonstrations.

Writing

- Update your otuline according to the information you gathered.
- Have your outline reviewed by the technical contact.
- Write the information in short, simple sentences using the second person.
- If you have access to any algorithms to check the reading grade level, use them.
- Use analogies or metaphors to communicate abstract concepts. For example, the idea of a buffer in storage can be represented by a chalkboard.
- Distribute your draft for review. If you receive comments to add information, make sure the information is what the user needs to know to do a specific job.
- If you need to tell your user about the way your product relates to others, include tested examples and direct them to the appropriate manual in the other product library.
- Test your document. For example, the manual I wrote was tested in an administration center by five users over a period of one month.

Formatting

- Work with a graphic artist to create effective illustrations.
- Use white space, font/head size, and tabs to design the manual for ease of use and retrievability.
- Use ring or spiral binders to make your manual easy to use.

YOUR TURN

I hope this paper helps you use the task analysis method to write customer manuals. Remember, the important questions you need to answer are:

1. Do the customers need this information to use the product? If the answer is yes:
2. When will they use it?
3. How will they use this information?

If you can answer these three questions, you can give the customers the right information, organized effectively, and formatted in a useful way.

NEED TO KNOW: DEFINING A COMPUTER SYSTEM'S USER INTERFACE VIA SCENARIOS— A METHODOLOGICAL COOKBOOK

Allan Henderson
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Allan Henderson
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This paper presents a step-by-step, cookbook approach to defining a computer's user interface with the "scenario methodology." Beginning with the premise that a computer's user interface is an "information interface" that includes published manuals as an important part, this paper leads the reader through a five-step process, with concrete examples of what should happen at each step. The reader can then use this as a model in defining user interfaces for other systems.

INTRODUCTION

In this paper, I want to examine a method for defining a computer's user interface, which includes documentation (published manuals) as an important part. The method I use is based on the idea of scenarios. By "scenario" I mean a step-by-step description of user actions to accomplish a task that is important to the user. For example, creating a new document is an important task to do with an office system. The precise steps the user must take to create that document is the scenario.

To make this discussion clearer, let's assume that we are designing a new, computer-based office system, called MAGUS. (Short for MAGnificent User-oriented System.) The general characteristics of MAGUS are:

- Video display terminal
- Text editor, that allows you to create, store, and update documents
- Electronic mail subsystem, so you can send documents to other people using MAGUS Printer
- Printer

MAGUS's user interface is made up of these parts:

- The computer hardware (display screens, keyboards)
- The information on the display screen for interacting with the system (messages, menus, command language)
- The documentation, or "information about" the system (system manuals, education packages, help facilities)

The examples I present for this fictitious MAGUS system are not intended to be complete, but simply indicative of what you will need to do when you design a user interface for your own system.

The remainder of this paper will describe a five-step recipe for designing and updating a user interface for a computer system. (You can modify this recipe to apply to your own system.) The main goal here is your understanding one approach to defining a coherent and integrated user interface, including the hardware, software, and "documentation."

Step 1. Define the Primary Users of MAGUS

The first step is to understand who will use the system, in our sample case by defining the intended users of MAGUS. People generally respond to products that meet their needs; but even before you look at the needs you must define who you expect to use the product.

Suppose that these are the intended users for MAGUS:

- Principals (managers, professionals)
- Secretaries
- Clerks

Let's look at the principal in a little more detail:

- Some principals know nothing about computer-based office systems and do not want to know very much. These principals are executives (or at least think like executives) who expect the secretary to do all the administrative work. These principals are not likely to type their own memos, or even update them. Their main use of MAGUS is to look at formatted documents in soft-copy form and to send short messages to other users (mostly to the secretary).
- Other principals are very interested in using computer-based office systems. (These principals are generally the junior executives with less responsibility.) These principals can be expected to update and print their own memos, although the original typing will be left to a secretary. They will also look at formatted documents in soft-copy form, as well as send messages and documents to other users.

While I can just sketch the user description here, a complete description should really list every relevant fact about each user for your system. Things like work habits, work experience, previous experience on similar products, responsibilities, and attitudes toward the product are all very important to know.

Step 2. Define the Primary System Tasks

The next thing to do is to define the *tasks* that the user can do with the system. For MAGUS, the task list may look like this:

- Creating a document
- Updating a document
- Printing a document
- Sending messages to other users
- Transmitting entire documents to other users
- Filing and retrieving documents

Additional "system-related" tasks also exist, such as:

- Installing the system
- Handling problems as they occur
- Starting up the system each day
- Defining user profiles

Again, these lists of tasks are not intended to be complete, but the task list for your own systems should be as complete as you can make it.

Step 3. Construct a User-Task Matrix

This step is the heart of the "scenario approach." Here you develop a two-dimensional matrix, showing which users (from step 1) will do what tasks (from step 2). The matrix includes "codes" that give the priority of the task for each user type. (The codes are explained after the matrix.)

	Secretary	Principal	Clerk	System Support
Create document	A	C	A	Z
Update document	A	A	A	Z
Update and distribute	A	C	A	Z
Print document	A	C	A	Z
Send message	B	B	B	C
Transmit document	B	B	B	Z
File and retrieve documents	A	B	A	Z
Install system	Z	Z	Z	A
Handle problems	Z	Z	Z	A
Start up system	C	Z	C	A
Define user profiles	Z	Z	Z	A

A = High priority
B = Middle priority
C = Low priority
Z = Not applicable

Step 4. Develop Task Scenarios

In this step, you take each "important" box from the user-task matrix and develop a task scenario. Which of the things from the user-task matrix are "important" will depend on the characteristics of your specific system. You may decide that all boxes marked A are important, or that all marked A or B are important, or some other combination.

A task scenario is a step-by-step description of something the user wants to do, from the user's point of view. For example, an "Update and Distribute" scenario could look something like this.

1. Log on
2. Get existing document
3. Make changes to the document
4. Electronically distribute the updated document
5. Print out a copy with the distribution list
6. Log off

A task scenario for printing a document could be:

1. Log on
2. Get the document
3. Send the document to the printer
4. Log off

As you see from the examples, the task scenarios are written from a functional, not implementation, point of view. That is, you say "get the document" but *not* "use the GET command to move the document from the archive storage to the user's temporary storage."

Now that you have these scenarios, what do you do with them?

The scenarios you construct are the tools to keep the user interface integrated and coherent. Each scenario is an "important" use of the system, which must be easy to learn and easy to use. As you decide exactly what the commands in the system will do or which manuals you will provide to document the system, you check each decision against the appropriate scenarios.

For example, you could check the design for the command language for printing a document:

Task Step	*Command*
1. Log on	LOGON
2. Get the document	GETDOC
3. Send the document to the printer	PRINT
4. Log off	LGOFF

The users that print documents with MAGUS are secretaries and clerks. (See the "User-Task Matrix" above.) The question you need to answer is this: is the command language appropriate for secretaries and clerks to print documents according to the "printing" scenario? That is, is the "printing task" easy to learn and easy to use for the specified users?

As another example, you could check the design of the documentation required for printing a document:

Task Step	*Information Source*
1. Log on	Primer, Reference manual
2. Get the document	Primer, reference manual, online help
3. Send the document to the printer	Primer, reference manual, online help
4. Log off	Primer, reference manual, online help

You now need to answer the same basic question: is the documentation appropriate for secretaries and clerks to print documents according to the "printing" scenario? That is, does the documentation contribute to the printing task being easy to learn and easy to use for the specified users?

Step 5. Keep the Task Scenarios and User-Task Matrix Alive

Once you build the system, what do you do with the task scenarios, the user-task matrix, and the rest of the things you developed following this recipe? Don't throw them away.

All systems change over time. The user interface will change with the addition of new commands, new documentation, and new hardware. New user types may be added as the market for the system expands.

You should continue to use the user descriptions, the user-task matrix, and the task scenarios to check whether changes to your computer system maintain the existing ease-of-learning and ease-of-use characteristics for your system.

THE TOTAL APPROACH

When defining a new system interface, the basic idea, then, is to develop a set of scenarios, a series of step-by-step descriptions of things that the expected users will do with the system. The key to making the approach work is to devleop the scenarios from the user's point of view, so that the system's ease of use and ease of learning follow naturally from the scenarios.

In summary, the recipe for doing this is:

1. Define the primary users of your system.
2. Define the primary tasks to be done with the system.
3. Create a user-task matrix, which shows which users from step 1 do what tasks from step 2.
4. Develop the task scenarios for important items in step 2, and check your system and information design against those scenarios.

POSTER

NEED TO KNOW: THE WAY TO GO
MIXED-MEDIA ADVERTISEMENT FOR PANEL AND WORKSHOP

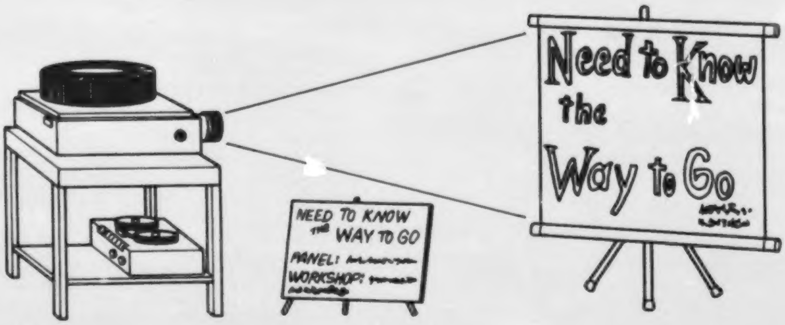
Allan Edmands
International Business Machines Corporation

Allan Edmands
Data Systems Division
International Business Machines
Corporation
Associate Information Developer
Kingston, New York 12401

- Moderator, 29th ITCC Panel
- Speaker, 1983 ACM SIGDOC Conference

PURPOSES OF THIS POSTER:

- *Briefly describe how, through task analysis, information can be tailored to a user's need to know.*
- *Be an example of technical communication not using the print medium.*
- *Attract attention to the "Need to Know: The Way to Go" panel and workshop.*



TECHNOLOGICAL DESCRIPTION:

This poster is actually a mixed-media exhibit consisting of the following elements:

- Audiotape loop
- Continuously advancing slide carousel
- Placard with schedule information

The poster presents the audience with successive pictures, associated spoken narrative text, and a fixed schedule reminder. The presentation takes less than 10 minutes and repeats continuously during the conference. (At specified times I will be on hand to answer questions.)

CONTENT DESCRIPTION:

The poster briefly describes the panel and workshop in a very skeletal fashion, in the same way that an abstract describes the overall arguments and conclusions of a paper. For example, each of the panel presentations is described in 10 slides or less, consuming a total of about two minutes.

Following the title board is a very brief overall explanation of the poster's contents. Then the poster introduces the topic of *task analysis* and how it can alleviate technical incomprehensibility by supplying just that information a user actually needs to know.

Then the poster introduces the panel titled "Need to Know: The Way to Go" and its speakers, Robert A. Ward, Georgiana Mitchell, and Allan Henderson. The poster refers to the placard for time and place information. Then each of the three presentations is described more specifically. As the spoken narrative proceeds, the slides show:

- The speakers
- Scenes relevant to the topics
- Text
- Diagrams
- Cartoons

Moving arrows point to relevant features of the visual information as they are being explained by the spoken narrative.

Then the poster introduces the workshop titled "Need to Know: The Way to Go" and its coordinators and refers the audience to the placard for time and place information. The poster lists the purposes of the workshop:

- Develop empathy for the user through experience with tasks.
- Define and analyze the audience explicitly
- Learn what a "task" is and how a "job" is broken into tasks

I'm not going to tell you here other ways the poster advertises the workshop; you'll just have to see the poster for yourself.

The poster concludes by summing up its overall theme: Developing information to meet an audience's requirements through task analysis–supplying what the user *needs to know*.

This poster is part of a comprehensive information package about task analysis, "Need to Know: The Way to Go." The entire package consists of these media elements:

- Audio-visual (the "Need to Know" poster described here)
- Print (this and other "Need to Know" papers in the *Proceedings* you are now reading)
- Oral (the "Need to Know" panel)
- Group participation (the "Need to Know" workshop)

Experiencing the entire package, you hopefully will be able to compare the relative strengths and weaknesses of these elemtns in presenting technical information.

THE WORDSMITH'S NEW TOOLS

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In a personal narrative, this paper describes how electronic tools are changing my work as a technical publications consultant. Traditional word-smithing changes when text processing involves electronic tools; new problem-solving assignments grow from the marriage of editing and electronics. Work styles become considerably more flexible. To do document-oriented jobs like editing, I link a microcomputer in my home office to my clients' mainframe computers and word processors. Electronic-assisted conferencing involves working directly onto terminals, simultaneously recording and editing conference output. "User-friendly" systems depend on consistent English expression; they match the information available to the users' needs. In automated document preparation, I help project managers improve people-and-machine interactions. New electronic tools give wordsmiths better ways to do complicated jobs. These tools demand skilled technical support, but they make possible new choices about work styles.

As an itinerant wordsmith whose stock-in-trade is the English language, I consult to make text clear, literate, concise, and on-target for its intended audience. For commercial companies, consultants, and academics, I write and edit reports, documentation, marketing literature, manuals, and proposals. I also devise "user-friendly" displays for computer systems and facilitate electronic-assisted conferencing. The microcomputer in my home office ties into my clients' installations. Increasingly, my work involves helping clients redefine document-preparation responsibilities and structure their operations to use electronic tools.

EDITING WITH ELECTRONIC TOOLS

Using electronic tools affects how I do both traditional document-oriented jobs and new problem-solving assignments. My microcomputer communicates with clients' mainframes and word processors; using it and the new techniques it supports, I write and edit text. Powerful, versatile tools like it enable me to tackle new kinds of problem-solving jobs that call for editorial expertise.

Old Jobs Involve New Tools

Many of my projects produce documents. Some assignments involve short notice and fast turnaround: the 60-page report on petroleum systems that's due next week, or the product-information sheets to accompany a spare-parts shipment in four days, or the journal article whose submission date is three days hence. I move quickly through these documents, identifying organizational problems, supplying transitions, pinpointing holes in logical flow, and making expression literate and appropriate for its audience.

Several of my assignments involve continuing projects. With some clients, I have long-term commitments to do particular kinds of writing. For example, I'm at the end of client X's panic button—he calls when a report deadline looms and he's going out of town. He may give me working memoranda, text fragments, and presentation slides, or he may simply have a proposed structure and notes. Relevant material exists somewhere in his word-processing system, so one constraint may be to assemble the report with minimal text entry. Client Y knows she can solve systems problems but that she has trouble communicating her solutions in anything but computer language. She needs help to formulate an outline and dictate text; then she works at her familiar terminal to make the two fit.

Other clients retain me to be the publications consultant on their project teams. For example, during the development of a major insurance company's financial information system, I edit memoranda, write critiques of system screens, and edit the mid-project report to senior management. For another client, I write and test the user documentation for a back-office system for small thrift institutions; if I can make the system fail, users will too. None of these assignments can be characterized as "new," but my work on all of them changes as the tools change. In particular, all these projects go faster because new electronic tools eliminate intermediate manipulations like re-keying; any time after text enters the automated process, I can change, move, copy, or otherwise massage it into the form desired.

Virtually all of my clients use some sort of word processing; in my own office, I use a microcomputer to write anything longer than a postcard. The micro ties into my clients' mainframe computers or their word processors via telephone lines. For straight editing, I receive raw text through a telecommunications modem, use a text-editing program to enter changes, and send the document back to the client to format for printing. My office equipment includes a dot-matrix printer with a good 10-point proportional-space font that resembles impact printing. Unless the printer is "down"—and, being more mechanical than anything else in my computer rig, it more often gives me trouble—I print out hard copy and read through it for appearance and for typos. During this editing process, raw text can come from clients' files and return edited—without the touch of a pencil!

I flag author queries in the text, using a double-asterisk (**) as a search string that machines can find automatically. The search string works like circling printers' notes on a galley; all of us involved with a document—author, editor, and support staff—mark questions as we insert them. Then, as we work through the document independently, we search to see what questions have arisen. A mandatory final scan of the text ensures that comments don't show up in final text. Putting comments, questions, and observations directly into the text often makes people uncomfortable initially, but it's a marvellously efficient process. I put "Is this correct?" after an editing change or insert question marks around technical terms that haven't been defined sufficiently. Only if the meaning of a whole passage isn't clear do the author and I have to sit down together; otherwise, I enter tagged queries during editing and the author works them out all together at a different time.

Considerable benefits accrue from this automated process. Working on a copy of the main file, I test various constructions and tinker to get the best wording. Double transpositions are easy; recast sentences have active verbs and fewer prepositional phrases. When I send text files directly to the author's system, no re-typing errors can creep in. If capacity is available, it is often easiest to load text onto a large, mainframe computer; such machines, which generally run 24 hours a day, are convenient intermediates from which to copy off text at will with a word processor or microcomputer.

Sometimes when deadlines are tight, I edit directly on a client's word processor. The process is much faster and surer than marking paper, having a secretary make changes, and proofreading to see that the changes are correct. Finished copy comes more quickly, even if the particular system is somewhat unfamiliar.

Whether the project is large or small, making corrections, proofreading, and formatting change markedly with the wordsmith's new tools. Automatic re-formatting capabilities make changes vastly simpler to accomplish—just type over or insert, press ENTER, and watch the screen reformat. Using automated search, someone making corrections can find particular text easily; insertion and deletion modes and text-copy and text-move capabilities make changes easy. I specify changes to one part of the text without worrying about new errors being introduced into already correct, unaffected text. Final formatting automatically paginates and adds headers and footers. Support-staff members produce camera-ready copy locally for authors to check; their equipment can tie into automated typesetting.

Project managers can choose between saving time and eliminating more errors. In the same time that one "quick-and-dirty" pass through a document used to take, I can now make two or three passes; the project manager may choose to spend less time to get the previous quality or to spend the usual amount of time to get better quality. Part of my consulting role involves helping managers see the risks and benefits of each option. At the manager's chosen point, I tell the support staff that they should change nothing that isn't marked, because I'll be reading only corrections—and that I'll be responsible for any typographical errors. Once corrected, automatically prepared text sprouts no new typos unrelated to changes.

One document-producing job depends directly on using a new electronic tool. To do interactive editing, an author and I work together at a word-processing terminal; we use a text-editing program to record ideas and turn them into finished documents. The process works both with articulate and inarticulate authors. The inarticulate ones who speak only in technical tongues can be induced to define terms as they talk about their current projects. Articulate authors seem to delight in the ease with which their ideas can be captured, smoothed, reworked, and tightened. For example, when the author has already produced five or six pages of rough text, it takes only a day or less to turn out a slick, well-organized magazine article.

New Tools Plus Editing Expertise

In addition to document-related jobs, I also tackle problem-solving that combines electronic tools with word-crafting expertise: electronic-assisted conferencing, "user-friendly" computer displays and manuals, and documentation systems.

Computer-assisted conferencing puts electronic editing and note-taking into live conferences. The problem to be solved in this situation is to record the conferees' ideas in the most direct, easily usable form. Instead of scribbling cryptic notes or winnowing points from audio tapes, I edit directly onto a terminal as conferences take place. Participants still use blackboards and flipchart sheets, but the process yields much more than simple transcription of these aids. It captures particular points and wordings as they come from participants and yields files of text that can be printed or built upon as needed. Computer-aided conferencing demands fast typing, familiarity with the subject, ability to capture key words and phrases, and skill to supply connections after the conference ends. In this process, I'm a participant, rather than just a recorder; the job involves asking, "What do you mean by . . . ?" or "Is it the main point that . . . ?"

For some clients, I work through the "user-friendliness" of computer screens and manuals. Here, the problem is translation between computer programmers and non-computer-oriented users. In colloquial terms, the task can be defined simply: A friend does not make you feel stupid. The screens and manuals of a user-friendly system tell what to do next and give help if the user doesn't understand. A friendly system forgives most mistakes and doesn't allow the user to destroy work already done. The process of making a system user-friendly includes establishing consistent expression that uses English rigorously and chaining together subsets of screen instructions for different levels of users. It identifies missing or ineffective transitions from action to action, and it supplies help and reference material matched to users' needs. Usually, the process involves four steps:

- excercise the system completely,
- map its actions,
- make the wording clear, concise, and unambiguous, and
- identify and key sub-sets of information according to user groups.

This work calls for an editor who either knows little about systems (except that they're incredibly literal!) or an editor who can conveniently forget what she knows; I fall somewhere in between.

In another type of assignment, I survey clients' document-preparation operations and suggest how people-and-machine interactions can be improved. The problems to be solved range from technical ones about machines' formatting capabilities to staffing ones about who is responsible for automated files. During editorial conferences, I work with project managers to establish documentation standards, set styles and formats, and outline document-control procedures. This function isn't new, but it has changed considerably with automated tools. For example, something so simple as a standard document header can improve project control by eliminating stacks of unlabelled, unnumbered pages; such a header lists document number, project identifier, title, author, editor, secretary, date, and page number.

Long-term, multi-author projects go more smoothly with electronic tools. For example, project members agree on document formats, which are then stored and called up as needed; temporary work overloads are split into manageable chunks and reassembled easily. Such projects do require some effort to ensure that team members don't create parallel versions of documents. Penciled changes made to 100 pages of the last-but-one version frustrate both the editor who does them and the project manager who pays to have them transferred to the current version. Electronic changes are invisible, so strict control of revisions becomes mandatory.

WORK-STYLE CHANGES

When word-oriented people like me change our working methods to use highly complex machines like computers, we can be overloaded easily with technical details. Altering our work styles requires determination, and it also demands technical support. As experienced communicators learn to use new equipment, they also learn to deal with added frustration; nothing is so dumb as a powerful machine with a "bug." Generally, these problems are offset by new freedom to do business at a distance, while managing other aspects of life.

Technical Support

For me, fees for hardware-repair people and for software consultants are unavoidable business expenses attached to the wordsmith's new tools. Finding appropriate people to deal with systems problems isn't easy, but success pays fat dividends in hassle-free, efficient operations.

First, editorial people like me need help to choose and maintain hardware. Hardware isn't my bag—so far as I'm concerned, the machines can use black magic. I'm blessed by knowing a superb repair person who doesn't laugh aloud when I ask dumb questions; he takes my malfunctioning disk drive or printer, tells me what's hard and what's easy to fix, and lets me know if he needs special parts or technical manuals. He answers questions about advertisements I see in computer magazines. He suggests pieces of equipment that will make my work easier, and he sends me to other technical people whom he trusts. Knowing someone like this is like knowing a plumber who comes when the dishwasher backs up on Thanksgiving.

Non-technical users also need help to choose and use editing and formatting programs. Various programs have different capabilities. For example, some open one line's space for adding text—a practice that's good for writers and editors, who need to know context. Other systems blank the screen below the insertion point—a practice that's fine for word processing but terrible for writing. Nothing compares with actually using a program to see if it suits, but a few minutes' time talking to someone knowledgeable can save lots of test time. Finding such a person lessens my feelings that the only way to learn about a particular program is to spend money and then hope.

Like other people who use computers in their work, writers and editors often use their machines in other business-related areas. For example, I maintain a case log to record my hours, charges, and expenses. Ideally, it would automatically sum charges by client, print out bills, and calculate mileage for tax purposes. All of these tasks are certainly within my computer's power, but I lack the programming skills to implement them.

Non-programmer editors like me incur expenses for help to deal with the "black-box" world of half-duplex, parity, and baud that envelops us when our computers talk to other machines. For example, one mainframe stops to put a line number on each 80 characters of text as I send it; if my computer doesn't stop and wait, the transmission loses the first few characters of every line. My very powerful terminal program can handle this problem, but I need help to figure out what values to put into which translation table.

Skills and Work Habits

Experienced communicators learn new skills, deal with additional frustrations, and develop different work habits when they work daily with the wordsmith's new tools. Like a baby, my computer can't tell me where it hurts; I know which end of a baby to pat, but I'm not sure about the machine. If I'm lucky, it does something non-destructive and waits for me to ask the right question or give the right command. If I'm unlucky or the machine is balky, considerable time and effort can yield little edited text. Because my command of the computer isn't very sure, I "back up" work by writing it out after about every two paragraphs added or changed. Small systems tend to impose their own standards about prudent operating procedures. For instance, in my text editor, Control P prints out text; Control O—which abuts—sends me out of the editing program and wipes out everything I've written.

Like a typewriter, my microcomputer is available 24 hours a day, seven days a week in my home office. With telecommunications links, I can send text to clients whenever their computers are receiving—even in the middle of the night; in fact, most transmission charges are substantially less for off-peak hours. The text-crafting capabilities of the computer allow me to work much more quickly, but its reliability doesn't come close to that of a typewriter. If it malfunctions, my text will probably be unavailable—at least until someone else wakes up. Also, mistakes I make with the computer tend to destroy much more text at a stroke than is possible with any typewriter; the later the hour, the more care needed.

Heretofore, I've worked mostly in my own office, going to clients' facilities only to pick up and deliver jobs, to resolve queries with authors, or to supervise production. Now, pickup, delivery, and queries depend on telephone lines and computers, rather than transportation and personal availability. Instead of spending time on these routine chores, I work in clients' offices doing interactive editing or problem-solving assignments.

Every writer's dream of "that job I can do on my own time" comes closer to being real with the wordsmith's new tools.

For example, we can better juggle hour-to-hour childcare or distance or physical handicaps. Working at home with a sick child may not be easy, but it is possible. Combining electronic editing with telecommunications makes it reasonable for a wordsmith also to handle primary childcare and manage a household. Physical infirmities become irrelevant, as does distance from clients' offices; editors who can't climb stairs or who choose to live in rural isolation can work with authors who write in urban skyscrapers.

SUMMARY

Electronic tools like microcomputers and word processors change many aspects of a wordsmith's work; they enable new techniques such as pencil-free editing, interactive document production, and electronic-assisted conferencing. These tools also make possible real alternatives to conventional work styles. With solid technical support, non-computer-oriented communicators can link home offices to clients' installations and manage both professional and personal responsibilities.

PUBLICATIONS AND TRAINING: ACCIDENTALLY ON PURPOSE?

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Everyone's a writer, everyone's a teacher--you shouldn't avoid it these days. This personal and down-to-earth approach may mean survival for a data processing shop as it evolves. You know the story --meeting the users' needs. The question: should publications and training be in the same department or area in an organization--accidentally or on purpose? This paper investigates the circumstances at a large data processing shop at a major university to show the growth of technical writing, staff training, user needs, and the eventual merger: publications and training.

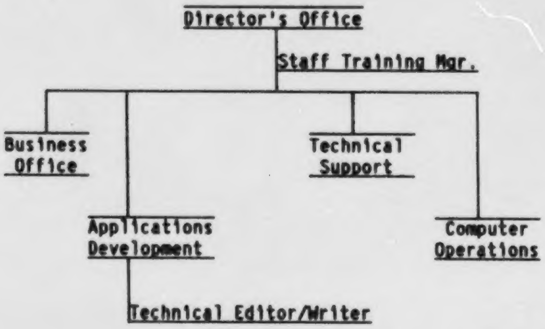
> In the early 1960's, an interviewer was trying to get Ernest Hemingway to identify the characteristics required for a person to be a "great writer." As the interviewer offered a list of various possibilities, Hemingway disparaged each in sequence. Finally, frustrated, the interviewer asked, "Isn't there any one essential ingredient that you can identify?" Hemingway replied, "Yes, there is. In order to be a great writer a person must have a built-in, shockproof crap detector."
>
> It seems to us that, in his response, Hemingway identified an essential survival strategy and the essential function of the schools in today's world. One way of looking at the history of the human group is that it has been a continuing struggle against the veneration of "crap." Our intellectual history is a chronical of the anguish and suffering of men who tried to help their contemporaries see that some part of their fondest beliefs were misconceptions, faulty assumptions, superstitions, and even outright lies. The mileposts along the road of our intellectual development signal those points at which some person developed a new perspective, a new meaning, or a new metaphor. We have in mind a new education that would set out to cultivate just such people -- experts at "crap detecting."
>
> -Neil Postman/Charles Weingartner
> Teaching as a Subversive Activity

The Administrative Data Processing Department (ADP) at the University of Wisconsin-Madison does administrative computing as well as office systems and word processing services -- payroll, budgeting, accounting, parking, student registration, financial aids, grade reporting, libraries, hospital, radioactive inventory, experimental animal control... A handbook about UW's "dp shop" might put it this way: "ADP's computerized systems and services provide the capability for the various user departments and organizations within the institution to utilize state-of-the-art data processing and word processing facilities for ongoing administrative functions in a more timely, accurate, and cost-effective manner."

The data processors (computer programmers, data processing systems analysts, directors, managers, technicians, office systems analysts...) and the users (deans, directors, accountants, librarians, word processing operators, professors using radioactive materials or lab animals...) must communicate with each other. Although our ways of producing, manipulating, and displaying information are changing, the communication is usually written. Whether it's hand-written; produced by electric typewriter; word processed or phototypeset; printed on a daisy, dot-matrix, or laser; or displayed and manipulated on-line -- it's written, documentation as data processors call it. If you're lucky, it's well written and easy-to-use. Sometimes, this even includes training.

HISTORY

At ADP the Technical Editor/Writer and Staff Training Manager are highly technical programmer/analyst positions. Both were promoted along with the rest of the programming staff as their technical expertise increased and they played a higher role in the decision making and consulting aspects of their key but separate jobs. Both positions were created about four years ago and tacked on to the existing organizational structure. Here's how it looked on paper:



As ADP's first "technical writer," I was hired primarily to teach technical writing to the staff, to edit the staff and user newsletters, and to edit highly technical project proposals, system specifications, and user handbooks. The training manager was hired to coordinate staff training primarily for programmer/analysts learning new hardware, software, and analysis and programming techniques. The department's staff increased and user demands started changing because of our Office Systems Network (a Wang word processing system linked to our IBM 3083 mainframe and Xerox 9700 laser printers).

More emphasis was now put on the non-technical, instructional user manual. In the past they were sort of "mini-specs" with tabs, or the "good-parts edition" condensed from the mountains of required paperwork to bring up a system. An OK manual for a highly-technical user. However, once Wang workstations start appearing on the desks of people who didn't design the system, we have requests for "translations" of some 600 teleprocessing transactions. The first question from this new breed of user ("occasional/professional" vs "primary/technical"): how do I know if I even want to use it - who can even understand the acronym used to title the system? Interim solution: hire another technical writer, and ask the training manager to take on a second full-time job -- user training. It didn't work.

EVOLUTION

User Training services are a natural outgrowth of technical writing services: user newsletter; user programmer guides; word processing and office systems handbooks; teleprocessing documentation; programming and documentation standards and policies; project management and system documentation; user documentation classes; document production and design via the Wang OIS 140s, IBM 3083, and Xerox 9700 laser computers; and consulting in all areas of written and oral communication, word processing, and document production.

Working as programmers, analysts, writers, editors, and instructors, the technical writing staff (of 1 with a half-time student) established a rapport with most departmental staff and with many users. The writing staff has been involved with the development of projects in every area of data processing and word processing and has helped design a variety of courses and detailed presentations for users.

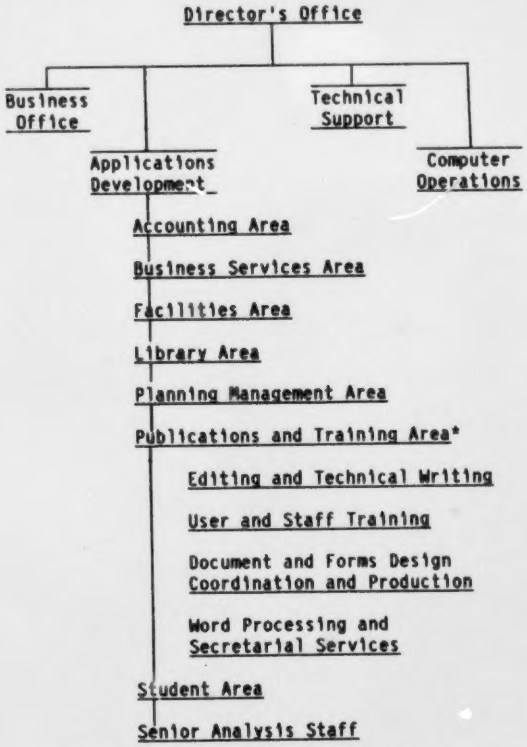
Another aspect is the move from typical technical data processing documentation to technically-accurate publications with all the trappings of journalism and advertising. The ability to "translate" documentation into instruction and reference materials requires a working knowledge of the systems involved.

As ADP's need for more information about its new and changing services has grown, so has the technical expertise of its writing and training staff increased. Good information goes hand-in-hand with good service. To wield such a heavy two-edged sword (three-edged shovel?) requires detailed knowledge of the fields -- data processing, word processing and distributed systems; teaching and writing; and the untilled back forty.

So it made sense to put user and staff training (which had been tacked together without any increased support) in the technical writing area where it's already evolving and can continue to grow as ADP and the University grow. Right?

THE ANSWER

In August 1983, (2 months after ADP hired a second full-time writer/editor) it established a new Applications Development area called Publications and Training. Here's how it looks on paper:



*I accepted the role of "acting" area manager.

GETTING THERE

Here's a check list to help you get there (on purpose), to explain how we're getting there, and to help us all figure out what "there" is.

1. By way of introduction to ADP & UW-Madison
   - 3.5 million books
   - 2.5 thousand faculty
   - 3.5 thousand academic staff
   - 8.0 thousand classified staff
   - 150 ADP staff
   - 80 programmers at ADP
   - 600 teleprocessing transactions
   - IBM 3083, 2 Xerox 9700s, 40 Wang OIS 140s (400 workstations, 100 printers)

2. By accident, by design
   - technical writers
   - training manager
   - forms coordinator
   - word processing support

3. By the way, there's one on your desk
   - CRTs and VDTs
   - terminal rooms and workstations
   - ergonomics

4. By way of an answer: the user interface
   - understanding "user friendly"
   - human factors, human engineering
   - the myth of "living" documentation
   - lazy learn.
   - end user (primary/technical), new user
   - expert vs naive
   - professional user, occasional user

5. By the time you ask the question: what we're learning
   - test (each course, each document)
   - design
   - marketing, advertising
   - teach vs train
   - reference vs instruction
   - easy-to-learn vs easy-to-use
   - pretty printing, layout, format
   - consulting
   - wrong questions?

6. By way of survival: project management
   - weekly?
   - quarterly?
   - yearly?
   - long-range?
   - can do
   - can't do
   - won't do

STAYING THERE

Here's how the personnel department explains Publications and Training at ADP:

> The Publications and Training Area was established due to the rapidly increasing need/demand for staff and user training and documentation. The increased number and complexity of ADP application systems together with the introduction of distributed processing and user programming staff authorization on ADP's mainframe computer have significantly contributed to the workload and impact of these objective areas. The phenomenon of increased emphasis and importance to these two areas is representative of current data processing industry trends. A recent study by an independent consulting firm recommended that increased staffing and greater priority be given to them.
>
> The successful utilization of data processing applications and systems on the Madison campus, as in any organization, is dependent on staff and user knowledge of what the systems can accomplish, how they work, and how to use them. The significance of the above cannot be emphasized enough. We view Staff and User, and Technical Writing and Editing as separate data processing project areas. These project areas have departmental and agency-wide implication and responsibility.
>
> We feel that the aggregate responsibility for the above described major project areas plus the responsibility for Forms Design and Coordination as well as Word Processing support is sufficient for the requested level Area Manager position.

See my translation in the article "Publications and Training" in the first issue of ADP NEWS (see APPENDIX). As this paper goes to press a lot of things are up in the air. I'm still acting and I'm interviewing for new full-time positions in both writing and training.

CRAP DETECTING

It's not just the great writer who needs the built-in, shockproof crap detector -- so does the great teacher, training coordinator, and great actor.

Fortunately, we've been teaching our staff and some of our users how to build and use their own crap detectors in our seminar/workshop called "Technical Writing: An Introduction." (See "Technical Writing: Common Sense with Style," 27th ITCC Proceedings.) The idea: by the end of the course the managers, programmers, analysts, and users begin to realize that they are the technical writers. They are responsible for getting out clear, easy-to-use information and instructions -- everyone's survival depends on it. The writing and training staff, on the other hand, are consultants, second opinions, resource persons, coordinators.

For ADP, I'm convinced we're doing the right thing. But as you read this, we've been at it for five years and we had all the good stuff along the way: management commitment, the best technology, and enough crap detectors to go around. They've not always been shockproof and we've been lucky, but we've got a Publications and Training staff -- accidentally and on purpose.

ADP NEWS

University of Wisconsin - Madison
Administrative Data Processing

February 1983

NEW IMAGE

This new format for the ADP Newsletter *allows us to typeset and run all copies on our Xerox 9700 laser printer. Since we can enter and format the publication right at a Wang terminal, this will save a lot of production time and enable us to send you ADP news more often. We hope to keep you better informed with more up-to-date information, including announcements of training sessions, new services, and trouble-shooting hints.*

The format of ADP News *may change often as we tune the typesetting package, making it more versatile and easier to use. (We're also working on an instruction manual to enable you to use this package.) Look for this newsletter about every 4-6 weeks -- we'll send it out more or less often, as needed.*

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PUBLICATIONS AND TRAINING

by Cliff Dillhunt

Last fall, ADP established a new management area called Publications and Training. This area will keep you informed of new services and facilities as ADP develops them, and coordinate training development to help you learn to use them. Part of our effort includes this newsletter and the training needs assessment discussed in another article (page 2). Here are two other projects we're working on:

Teleprocessing Transaction Catalog: We're making progress on the catalog describing the transactions most useful to you. The programmers, users, and writers are working hard to meet that spring deadline for the catalog mentioned in the December ADP Newsletter. *We remind you that the list of all ADP 3270 transactions is available from our librarian, Phyllis Baumgartner (3-1252).*

How-to Publication: After close work with a documentation consultant, users, programmers, and our own writing and training staff, we are in the final stages of establishing standards and guidelines for writing the user manual. (We've heard it called everything from useless manual to abuser manual.) We've learned a lot and know that those of you receiving the new-style useful manuals as part of our pilot project are pleased. Thanks to those who participated in interviews and those who have shared their views in the writing class we offer. Yes, you're welcome to send manuals over to our Publications and Training staff. Call Jane Ruhland, our publications editor at 3-2375 (or send her something -- room 3290, ADP, 1210 W. Dayton).

SYSTEMS ANALYSIS AND THE WRITING PROCESS

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Systems analysis, a managerial approach to problem solving, requires a full range of technical communication skills. Because most topics yield readily to a systems approach, young writers should avail themselves of this analytical tool. When used to organize a technical writing class, the techniques of systems analysis can help the communications instructor achieve a wide range of teaching objectives. Students are guided through a sustained writing effort focused on a single subject chosen from their own interests. The individual assignments constitute a whole which the student organizes as a full systems analysis document. The systems analysis approach is applicable to the college classroom as well as to the business world where the professional communicator wishes immediate productivity from the new writer he trains.

While working in industry, I discovered the interdependence of systems analysis and good documentation. When I returned to academia, my observations enabled me to develop a valuable methodology for teaching technical communication. This methodology should interest both the writing instructor and the professional communicator.

Systems analysis is primarily a management tool, closely, but not exclusively, associated with the computer industry. The systems analyst investigates weaknesses in an existing system, suggests how a system might be upgraded, and designs and installs complete alternative systems.[1] The study of a system, suggestions for change, and the design of something new generally result in a series of documents. These are likely to be successful only insofar as they present the analyst's work accurately, precisely, and persuasively.

Documents generated by the systems analyst in the course of a project are numerous and varied. These might include (to name a few): letters, memos, progress reports, feasibility studies,[2] a full systems analysis, a formal proposal, a design of a new system, and procedures and instruction manuals for implementing and using it. Writing is the analyst's primary tool. Clearly, the analyst's ability to use this tool determines the success or failure of his or her[3] project. The ability to write well is an essential skill of the systems analyst.

In teaching writing, I soon realized that the other skills of the systems analyst were, in turn, important to the technical communicator. Like the analyst, the writer must be able to do secondary and primary research, to identify problems and trace them back to their causes, to extract crucial information through interviews and letters and questionnaires, to suggest creative alternatives, to anticipate future requirements, to explain solutions persuasively, to draft written descriptions of as yet unrealized projects, and to teach people the use of devices not yet created. Because the work of the writer is so similar to that of the analyst, the analyst's job provides an ideal training ground for the young writer. This is all the more true because the system which an analyst investigates may have nothing to do with computers; he or she might, for instance, study the feasibility of replacing a library card catalogue with a microfiche system for referring to book titles. A systems analysis project might interest a student who wished to stay as far as possible from the world of computers. For instance, one textbook on the subject is devoted to explaining Louis XIV's Versailles as an extended illustration of the systems analysis approach.[4] Those who have traditionally approached their discipline in terms of systems analysis include linguists, biologists, cultural anthropologists, transportation experts, economists, sociologists, product marketing analysts, environmentalists, and so forth. I have yet to find a student who had difficulty applying the techniques of system analysis to some aspect of his studies. This is essential, because my technical report writing classes drew students from a wide range of disciplines in schools of engineering, science, and management.

Course Objectives

By teaching the techniques of systems analysis to writing students, I accomplish a number of the usual goals of a technical writing class. That is, I teach audience analysis, organization, rhetoric, editing, and so forth. What is most important, I show the students how to maintain an extended documentation effort. The student does not work without guidance. He is confronted with a series of small, weekly assignments which, when compiled, constitute a full analysis of a small system. For the purposes of the course the student may find it useful to consider himself to be a highly paid consultant called in at the request of those responsible for the system.

Writing Assignments Using a Systems Analysis Approach

The first assignment requires each consultant (read student) to produce a memorandum proposing for analysis an existing system from his own interests and discipline. Civil engineers are likely to choose to analyze a system of traffic lights, the local water treatment facility, or the campus shuttle bus. Mechnical engineers are fond of solar heating, industrial robots, and computer aided design packages. Accountants have any number of record keeping systems to choose from. Students can select projects from their extracurricular interests. I have read admirable papers on photography and home woodworking systems. Because systems analysis is merely a methodology for investigation, any number of subjects are appropriate as class projects.

A somewhat lengthier assignment requires the student/consultant to gather information on the field he is investigating. This should result in a two to five page paper. This secondary research project will not result in a full blown "research paper," but should provide the student (and instructor) with pertinent historical background about the topic as well as information on the latest innovations in the field. For undergraduate work, a brief bibliography of from five to twenty articles is appropriate. In all, this assignment prepares the student to write intelligently on his subject, acquaints him with the appropriate technical jargon, and provides him with models of expression and presentation.

The next assignment requires the consultant do some primary research on the specific system which he is attempting to describe. This usually requires on-site interviews, but, when this is impossible, phone interviews and written correspondence can be substituted. Through his investigations the student attempts to familiarize himself with his topic while identifying what in the system has been successful, and what problems have occurred. During this phase of his investigations the student is required to submit a list of relevant questions which he is prepared to ask about the system. Letters, questionnaires, and other research tools may be submitted as appropriate. This phase of the analysis teaches investigative techniques and provides the student with some of the most practical training he can expect to get in a college class. It also affords him opportunities for establishing outside contacts in the business world.

When the consultant is ready, he is required to produce a description of the existing system. He should identify the salient purposes which the system serves and outline the major components of the system, indicating which components are subsystems in their own right. He should relate his subject to other systems which influence it. He should locate the system temporally, explaining how it evolved, how it now functions, and what its future is likely to hold. This life-cycle approach takes into account external factors (e.g. competition, government, the economy) as well as internal (e.g. good management, outmoded facilities). Most importantly, he must indicate how the system affects those who work with it, showing to what extent it aids, or gets in the way of their efforts. This phase of the analysis should result in a ten to twelve page report, complete with appropriate examples and graphics.

The consultant must give special attention to the problems of the existing system. (As a general rule, all systems have weaknesses.) He begins with a tabulated list of such problems drawn from his own observations and from his interviews with users of the system. He should rank problems according to importance and classify those which appear to be related. Problems not particularly related to the system should be eliminated. The result of these efforts can generally be reported in two to four pages.

Once described, a system must be evaluated. The consultant's researches and his efforts to organize his data should simplify this step. His knowledge will show him how a system might be improved; even successful systems are eventually superseded by innovative ideas and advancements in technology. Strengths of the system should be balanced against weaknesses. Rival systems should be described for comparison. The evaluation results in a list of alternative solutions. Possibilities fall under the following categories: 1) keep the system unchanged, (2) scrap the present system and replace it entirely, 3) implement useful alterations. Under the second category a sometimes overlooked alternative is the return to a previous way of doing business; a number of offices, for instance, were never quite so unhappy before they installed their new computer system. In general, the student is expected to evaluate and compare realistic alternatives for change. This assignment can usually be handled in four or five pages.

Analysis will show that some alternatives are superior to others. The consultant is now in a position to select one alternative from the many he has indicated and to argue for it convincingly. All the ground work he has done on previous assignments should enable him to argue with authority in his proposal, easily establishing the feasibility of his suggestions. If he is arguing for change, he should be able to describe how the system will function once his changes have been implemented. And if he is thorough, he will be able to indicate the probable strengths and weaknesses of the future system. His farsightedness in such matters can only add to the credibility of his proposal. In general this assignment yields from five to fifteen pages.

Submitting the Full Analysis: The Rewrite

For the student/consultant the most rewarding part of the project comes when he is able to compile the complete systems analysis document. All of his previous papers provide him with parts of the complete analysis. This assignment requires revision and an extensive organizational effort. With plenty of material to work with the student usually produces a document which exceeds his expectations--there is no staring before a blank page at this juncture. The fully revised report contains all the necessary aids to the reader, including title page, table of contents, table of illustrations, abstract, glossary of technical terms, and appendices. If sufficient headings and subheadings have been used, then no index is necessary. In a classroom situation reports might range from fifteen to fifty pages, but I make it clear that in industry they are likely to be much lengthier.

In the end the student/consultant must submit his report. If he is lucky he will find his best audience in those who use the system. In all events, he submits a written copy to the instructor and presents his findings orally to his classmates.

Fulfilling the Objectives of the Course

In college, the technical writing course, when it is taught at all, typically requires the student to submit a series of discrete writing assignments suggested in the textbook. A look at the more popular texts reveals an attempt to expose the student to the various species of writing he is likely to encounter on the job. Such exercises are excellent in themselves, but they do not prepare the student for a sustained effort in the job environment. Many college classes typically require the student to submit a lengthy term research project. In such situations the student is usually given little guidance. Nor is he always highly motivated to pursue a project which is at best ancillary to the course. Feedback is minimal since the instructor merely accepts the completed paper at the end of the term. Rather than pursuing such a project with any vigor the student with the obligatory term paper is likely to type up a last minute regurgitation of facts culled from a few texts he checked out of the library.

Following the patterns of systems analysis, the student is guided through related assignments which amount to a sustained documentation effort. While class time is spent on general techniques with students sharing their experiences, systems analysis projects are individualized, with each student pursuing his own interests. Students are given feedback on specific writing assignments a section at a time. They are required to respond by revising each part and submitting a reorganized whole. Most important for the students' motivation is the sense that they are identifying and tackling real problems. They are able to connect the analytical skills they learn in class with a communications task in the business world.

Notes

1. For a more complete discussion of systems analysis the reader is referred to Jerry FitzGerald *et al*., *Fundamentals of Systems Analysis* (New York: John Wiley & Sons, 1973); Robert J. Thierauf, *Systems Analysis and Design* (Columbus, Ohio: Charles E. Merrill Publishing Company, 1980).

2. In *Fundamentals of Systems Analysis* FitzGerald suggests that a "feasibility study can be viewed as a 'mini-systems study'."

3. Throughout the remainder of this paper I use masculine singular pronouns to refer to both sexes. Of course, the rising fields of technical documentation and systems analysis offer abundant opportunities to bright people of either sex.

4. See Joseph Allen and Bennet P. Leintz, *Systems in Action* (Santa Monica, California: Goodyear Publishing Company, Inc., 1978).

IMPROVE WRITING WITH PROBLEM ANALYSIS

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Planning is an essential part of any writing project. Unfortunately, we frequently shortcut the planning and jump right into the writing — especially on rush jobs. However, adequate planning enables writers to produce better publications, in less time, and at lower cost.

A good plan evaluates the potential problems that can cause a project to miss its objectives: time, content, or cost. This problem analysis enables the writer or manager to avoid many problems and to implement contingency plans for those that can not be avoided. Consequently, problem analysis will improve the quality of writing and the likelihood of meeting cost and schedule objectives.

Have you ever had a writing assignment that was free of problems? They seem to be inherent in every writing project. Loss of personnel, changes in the project, and production delays are common problems that keep us from reaching our goals. When such problems arise, the quality of our work deteriorates, our costs increase, and we fall behind schedule. Such problems are a major cause of poor quality writing. We spend so much time fighting problems that we don't have enough time for writing and editing.

We can stop these problems. If we analyze potential problems at the start of a project, many can be avoided. Others can be minimized.

If we know that a particular problem will occur, we can develop plans to react accordingly. Problem analysis involves seven steps to anticipate and react to problems. Each step is discussed below. Furthermore, the examples in Figures 1 through 3 further clarify these steps.

1. Identify Potential Problems

Most problems that we encounter are "old friends" that we have known on previous projects. To avoid or minimize them in the future, we must first look back and identify these "old friends".

We can also learn about other recurring problems through discussions with other communicators in our business or in STC. Potential new problems can be identified by analyzing the technology, management, and personnel on the project.

2. Analyze Each Problem's Impact

As we identify each problem, we should estimate its impact on the project. These estimates should be stated as precisely as possible in monetary cost, length of delay, or technical deficiencies.

3. Determine Causes

To avoid or minimize a problem, we must know what causes it to occur. Some problems may have several potential causes. We should examine at least the more significant causes for each problem. Then, we can estimate the probability that each cause is likely to occur.

4. Develop Prevention Plans

When possible, we should develop plans to prevent or minimize the development of each causal condition. Furthermore, we should estimate the probability of success and the expected cost of each preventive action.

5. Develop Contingency Plans

When a problem can not be eliminated, we should define contingency actions that can be used if the problem develops. This plan must include the contingency trigger, which specifies the conditions that must occur for the contingency to be activated.

6. Develop Action Plans

After we analyze the potential problems and the preventive actions, we should select the problems that would have the greatest impact and are most likely to occur. Then, we can develop specific plans for the least costly preventive actions that are likely to be successful.

7. Develop Realistic Project Plans

We should analyze the residual problems by considering the probability of each occurrence and the magnitude of its impact. Then, we can change the preliminary project plan by incorporating adequate time and cost. For example, if a problem has a 50 percent probability and it will cause a 2-week delay with a cost of $500.00, we should add 1 week and $250.00 to the project (50% X 2 weeks, $500.00).

This project plan should also include a project level contingency plan. This plan would be activated if the project falls behind in its goals (schedule, costs, information). An example of a project contingency plan is shown in Figure 3.

Problem analysis is a tool that managers and writers can use to:

- Eliminate problems
- Minimize the effects of other problems
- Accommodate problems that can not be ameliorated

Effective use of problem analysis will ensure that project objectives of cost, schedule, and quality will be realized. Furthermore, problem analysis will make a significant contribution toward improved employee morale.

PROBLEM ANALYSIS

POTENTIAL PROBLEM:	LIKELY IMPACT:
Inadequate input from developers	1 to 4 weeks more research time, numerous changes; 1 to 2 weeks rewrite time. Numerous technical errors.

POSSIBLE CAUSES	PROBLTY	PREVENTION PLAN		CONTINGENCY PLAN	
		PREVENTION ACTION	RESIDUAL PROBLTY	TRIGGER	CONTINGENCY ACTION
Lack of adequate specifications	20%	Follow the Standard Development Process.	10%	Specifications not ready when starting research.	Oral discussions with developers, use developer notes, listings, system logs, operation logs.
Insufficient access to developers for detailed discussions and explanation.	25%	Keep Development Manager informed about the continuing need for information.	5%	Writers 1 month behind schedule.	Notify Program Manager that the schedule is likely to slip.
Failure of developers to give review drafts thorough and timely reviews.	20%	Keep Development Manager informed about the importance of technical reviews.	10%	If reviews are not thorough,	Notify Development Manager that we will publish the information we have.
				If reviews are more than 1 week late,	Notify Development Manager that we will not publish without their input.
Development requests changes after publications are composed.	10%	Keep Development Manager informed about the status of publications.	5%	When changes are requested after publications are composed,	Notify Program Manager about the impact of changes on publication schedule.

Figure 1 Problem analysis example

POTENTIAL PROBLEM	PREVENTION ACTION	CONTINGENCY ACTION
Loss of writers	Motivate writers by maintaining a challenging work environment and by encouraging participation in project decisions.	Reprioritize project assignments to return project to an acceptable schedule.
Changes in publication objectives	Discuss the publication plan with the Program Manager to ensure that he thoroughly understands it.	Assign writers to other projects until a new publication plan is formulated. Then, assign extra writers to the project until it is back on schedule.
Changes in product design	Follow the change control procedures in the Standard Development Process. Make sure the Program Manager thoroughly understands the impact of changes on the Publication effort.	Revise the publication schedule and send it to the Program Manager and the Development Manager. Discuss significant schedule changes with them.
Delays in Art and Phototypesetting	Several weeks before publications are submitted, meet with the manager of Art and Phototypesetting. In this meeting, describe the types of jobs, the volume of work, and the desired schedule. Ask the manager to make a commitment concerning his department's ability to do the job on schedule.	Send the publications to a contract art and typing firm.

Figure 2 Problem summaries

PUBLICATIONS
CONTINGENCY PLAN

CONDITION	CAUSE	ACTION
I. Publications are 2 weeks or more behind schedule.	External Internal (Pubs) Personal	The writer meets with the Publications Project Leader to discuss project objectives and to identify reasons for delay. Each writer should document this meeting in a letter to the Project Leader. This letter should include reasons for delay and plans for getting back on schedule. If the reasons are personal, the plans should consider the use of an extended work week (unscheduled overtime) until the project is on schedule. The Project Leader should conduct progress review meetings weekly until the project is back on schedule.
II. Publications are 3 weeks or more behind schedule.	External	The Publication Project Leader should send a letter to the manager of the appropriate department. This letter should describe the condition that is delaying the publication efforts, the effect on the overall program, and request that corrective action be started immediately. Also, send a letter to the Program Manager explaining that the schedule or the content of the publication plan will have to be changed if the problem is not corrected immediately. To get back on schedule, Publications personnel should enlist the assistance of personnel from Development, Quality Assurance, Support, or Education. A letter describing the progress toward getting on schedule should be sent to the Program Manager with each monthly status report.
	Internal (Pubs)	The Project Leader should document the condition in a letter to the Manager of Publications with a copy to the Program Manager. Enlist writing assistance from other writing projects, contract firms, Development, Quality Assurance, Support, or Education. Rush the typing and art or send it to an outside contractor. A letter describing the progress toward getting on schedule should be sent to the Manager of Publications with each monthly status report.
	Personal	With the appropriate writers, the Project Leader should determine why previous plans have not been effective. Take appropriate personnel action as required. Change or enhance the plans to get back on schedule. Document the conditions and the plans in a letter to the Manager of Publications with a copy to the writer and the Program Manager. A letter describing the progress toward getting on schedule should be sent to the Manager of Publications with each monthly status report.
III. Publications are more than 4 weeks behind schedule.	All	The Project Leader should document the condition in a letter to the Program Manager. Suggest that he call a meeting to establish a new schedule, change the content of the publication plan, or evaluate other alternatives. Continue all efforts to expedite the publications.

Figure 3 Project contingency plan

TESTING USABILITY

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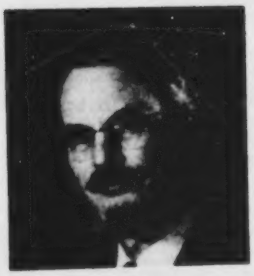

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IBM used several kinds of tests to assess the usability of written material for SQL/DS:

1. *Reading grade-level assessment*, based on well-known length-of-word and length-of-sentence formulas.
2. *Vocabulary testing*, using *The Living Word Vocabulary*, written by Edgar Dale and Joseph O'Rourke and published by World Book–Childcraft International, Inc.
3. *Cloze testing*, a fill-in-the-blanks exercise based on context.
4. *Retrieval testing*, to determine whether people can find the information they seek.
5. *Exercises*, to see how well people representing the readers can use the book (or panels) when working with the related IBM product.
6. *Satisfaction testing*, to measure people's opinions about the written material.

The results of testing the usability of the SQL/DS books indicated that most of the library met the usability goals that had previously been set. It was agreed, however, that the key book (the book for novices) should be reworked and retested before being distributed to customers. The scores for the reworked book showed improvement over the initial scores.

Testing Usability

This paper describes briefly the six kinds of tests used in assessing the usability of the books that accompany IBM's SQL/DS (Structured Query Language/Data System). The purpose of these tests was to examine the proposed books during their development and thereby assure ourselves that the books, by the time they reached their final form and were ready for commercial printing, would meet the needs of their readers.

When interpreting the results of these tests it was helpful to have the advice of trained psychologists.

It should be noted that this testing of usability was in addition to the usual testing for accuracy. A separate series of reviews and tests carried the responsibility for accuracy.

Reading Grade-Level Assessment

Reading grade levels (RGL) are usually measured as running from 6 or 7 to somewhere between 16 and 20. The "6 or 7" represents sixth or seventh grade in school. The 16-to-20 range represents graduate or post-graduate reading ability. Of course not everyone in a given grade of school reads with the same ability, just as students in the same grade do not have equal athletic ability.

It is possible to assess the reading grade level of written material by using length testing. By the term "length testing" I am referring to that group of formulas that arrive at a specific reading grade level. These formulas are based largely upon a count of the average number of syllables per word and the average number of words per sentence in the written material. This kind of test needs no people to serve as test subjects. All that is needed is the text, the formula, and some means—manual or otherwise—to count words, syllables, and sentences.

It sounds simple, and it is. I must admit that this simplicity kept me from using it for a long time. I believed that anything this simple could not be expected to have much value in assessing the linguistic and communicative complexities of writing. After all, I reasoned, writing is an art and therefore its worth is totally in the eye and mind of the reader. It seemed unreasonable to seek objective measurements of an art.

Then something changed my judgement. Expecting to validate my long-held views, I prepared sixteen samples of various qualities of writing and gave them to six test subjects to work on. The samples included both IBM writing and generally available writing from other sources. The sources ranged from newspaper and general periodicals to highly complex, technical material. (The subjects' task was to fill in answers on cloze testing, which I discuss later in this paper.) I also graded the samples according to how well written I considered each to be. Then I ranked the reading grade level of each, using a length-test formula.

The results were not what I expected. They were not what I wanted. They showed that the same three of the sixteen samples occupied the most favorable position in respect to four measurements: the reading grade level, the subjects' cloze-test time required, the subjects' accuracy of answers in cloze tests, and my own opinion. It was also apparent that the examples of poor writing scored poorly in all respects.

It became obvious to me that I had had the wrong opinion of length testing.

Length testing is not a new idea. It goes back at least fifty or sixty years. A 1974 report by Allen R. Williams Jr, Arthur I. Siegel, and James R. Burkett titled *Readability of Textual Materials—A Survey of the Literature* (published by the National Technical Information Service, US Department of Commerce) lists forty or more formulas. Gunning and Flesch formulas, the best-known formulas, are included in the list.

When most of these formulas were developed, the counting of syllables, words, and sentences was a manual task. It can still be done that way, but people, including hobbyists working at home, have written computer programs to automate the counting and calculating. If the text has already been stored in a word-processing system, some of these automated length-test programs can "read" those same words and then arrive at an assessment of the reading grade level. Thus it is not always necessary to rekey the text just to get a computerized counting process. Naturally such computerized testing has to be tailored to the particular equipment and goals that are at hand.

The results that we found after testing eight of the books that accompany SQL/DS were encouraging. Six of the eight books came in with scores that met our goals. The seventh book tested out to be a bit more complex than we had wanted it to be, but we still considered it acceptable. (The scores are not absolutes. We should expect them to vary as much as plus or minus one grade level.) One book, however, came in at a grade level of 12.8 when our goal had been 10.0. We marked this book for revision in time for the general release of SQL/DS.

Vocabulary Lists

The Living Word Vocabulary, by Edgar Dale and Joseph O'Rourke, is published by World Book–Childcraft in Chicago. The 1981 edition has

44,000 entries. For each listed meaning of a word, the book tells the percent of the students at a given grade level (4, 6, 8, 10, 12, 13, 16) who picked the correct answer in a three-choice multiple-choice test.

Although we do not limit ourselves to words of some specified grade level, we have found this book particularly useful when debating a choice of words. It presents a desirable impartiality.

In addition we have some IBM vocabulary lists that are specific to the subject matter that we publish and to certain groups of readers. For example, we have some vocabularies that contain a subset of English for use where the readers may be using English as a foreign language. We also have vocabularies that highlight shades of meaning, technical distinctions, and preferred styles in the battle for clarity and consistency.

Cloze Testing

Cloze is a fill-in-the-blanks type of test that was developed by W. L. Taylor about 1953. The name "cloze" comes from the psychological term "closure." The test asks people to fill in the missing words, basing their choice upon whatever clues are available in the general context. As you can see, this test makes reinforcement a virtue.

The way we build a cloze test is to select a text sample that is about 100 to 125 words long. We leave the first 20 words, including the heading, untouched. Thereafter we replace every tenth word with a blank. This means that sometimes the blanks replace a rather obvious word; other times the test subject's task is more difficult. The selection of words to be deleted is purely random. If the text has accompanying illustrations or charts, the test subjects receive them as well. Any sentences within such illustrations or charts will also have some blanks to be filled in.

We chose to accept synonyms. This made the scoring more complex than it would otherwise have been, because "right" and "wrong" became a matter of judgement. To maintain uniformity, the scoring was done by a committee of three.

In total, 82 passages of text from the SQL/DS books were presented as cloze tests. There were 37 different people who served as test subjects for the various tests. In the case of the cloze tests this meant that 560 papers were scored.

Originally we had hoped that the test subjects would be able to get 90 percent of the answers correct (accepting synonyms). We soon came to believe that replacing 10 percent of the words with blanks would cause more than a 10 percent degradation in readers' understanding. Based on an analysis of other material, we set new goals seeking only 75 percent of the answers as correct.

Except for the terminal reference book, all books met our goal. The terminal reference book was designed for people who had already gained considerable experience in using SQL/DS. Our test subjects were not able to gain adequate experience in the allotted time to participate in a meaningful test of the terminal reference book.

It is interesting to note the similarity when listing the SQL/DS books according to the scores from the length tests and the average times required by test subjects during the cloze tests.

	RGL	Cloze Time (minutes)
User Reference	9.5	1.50
User Guide, beginners	9.5	2.00
Installation	9.8	2.25
User Guide, experienced	9.5	2.50
Application Programming	10.6	2.50
Planning and Administration	11.3	3.00
Operation	12.4	5.00

Index Testing

We benefitted from our experience during the index testing of the SQL/DS books. As a result, we subsequently changed our methods somewhat. First let me describe what we did to test the indexes of the SQL/DS books.

The test subjects were allowed a few minutes to form impressions about the scope of the book, basing them largely upon the front cover and the front matter. Then they were told to close their books and write seven questions for which they thought the book should hold the answers.

Once they had written the seven questions, the test subjects were told to write key words to be used later when they would turn to the index. The subjects then continued to seek these key words in the index. Next they went on to the actual text pages that the index had suggested. Through all this process, the test subjects left a record of their time, their false starts, and their successes.

Our goal was to have the test subjects find answers to all their questions. Actually they found answers to about two-thirds of their questions. Although we recognized that some of the questions that the test subjects had formulated were not appropriate to the book at hand, we did agree that the indexes were deficient in the form in which they were tested. As a result, the indexes were enhanced significantly before the books were released for printing and distribution.

The recent testing that we have been doing has expanded the index test into a test of general retrievability. The tests that have been helpful are a scan test, a retrieval test, and a category test.

The scan test is to determine the subject's understanding of the scope of the book. The subject is given a brief period to browse through the book, thus forming an impression of the scope of the book. Next the subject is told to put the book aside and to open and examine one-line topics on a printed form. The subject is instructed to place a check mark beside each topic for which the subject expects the book will serve as the definitive source of information.

The retrieval test no longer requires test subjects to frame their own questions, nor does it require subjects to limit their search to the index. For the sake of uniformity, subjects are all given the same set of questions for which they will seek answers in the book. Further, no mention is made of "index," "table of contents," or any other particular retrieval mechanism. Instead the subjects are encouraged to find the answers in the book in any way they care to. While this is going on, trained observers monitor and record the actions (and reactions) of the subjects.

The category test, administered next, seeks to determine the classifications into which the subjects place the questions they have been answering. Our goal has been to see whether certain kinds of questions encourage subjects to use an index, while other kinds of questions encourage subjects to use a table of contents or some other retrieval mechanism. We expected that subjects might use the index when searching for information about known key words, that they might use the glossary when looking for definitions of specific terms, and that they might use the table of contents when looking for general or conceptual information. Our experience thus far suggests that the retrieval mechanism chosen by a given subject is more likely to be a result of habit and personal experience than it is to be a result of the nature of the particular question.

Exercise Testing

Exercise testing can take two forms: either the exercises in the book can be tested or, lacking such exercises, special exercises can be written to test the usability of the book. In both cases it is essential to simulate the expected user's equipment, skills, and tasks.

We limited our exercise testing to the most critical book, the user's guide that was addressed to the novice. This particular book was the key book in our testing and in the SQL/DS library. It was the guide to be used by the inexperienced person who would now be sitting at a computer terminal to do productive work as soon as possible. This person would look upon SQL/DS as a tool to be used in daily office work. To this person SQL/DS would not represent a career in itself. It was important that this book in particular be easy to use.

Exercises had been designed to be included within that book, and they were what we used in the testing situation. We set goals stating how many exercises the test subjects should be able to complete within the time allowed. While the subjects were doing the exercises at the computer terminals, trained observers recorded their actions and comments.

As a result of the testing, we found it necessary to break the exercises into smaller, more frequent units. In a perhaps related way, we found it advisable to start presenting exercises earlier in the book. In deciding the changes to be made to the book, the writer drew upon the findings of all the usability tests. When these changes had been made and the book was retested (using a new set of test subjects), the subjects' performance was noticeably better.

Satisfaction Questionnaire

Satisfaction questionnaires accompanied many of the tests discussed above. Usually these were about 15 questions long. To make tabulation of the answers easier, most questions were designed to be answered by a "yes" or a "no" or by selecting a number on a seven-point scale. (Since that time we have changed to a five-point scale because it does not call for as fine distinctions and is less demanding upon the subjects.)

In addition to presenting a written questionnaire, the test observers interviewed the test subjects. Information from these interviews then became a part of the test data that was collected.

Our goal was to see whether the books scored on the favorable side of the neutral midpoint. Not only did the results satisfy this goal, they also suggested some things that could be done to improve readers' opinions about the books. Fortunately the testing had been done early enough so that there was time to incorporate many of these improvements into the first generally available editions.

Conclusions

Three principal conclusions stand out from the rest and deserve mention here:

1. Most of the SQL/DS books met our testing goals—or required only minimal reworking to meet them.
2. One key book required, and benefitted from, significant reworking and further testing. We had allowed enough time in the schedule to be able to respond to the results of the testing before sending the book to be printed.
3. Some unanticipated findings appeared. We found that the need to achieve consistency of presentation to a particular set of readers was more important than the desire to achieve consistency of presentation throughout the full set of SQL/DS books. We found that a significant number of people do not use an index. In a similar finding, we verified that a significant number of people do not read a preface. We noticed how keenly readers crave drill and examples. Users of all books crave examples, but users of this terminal user's guide, in particular, also crave drill. Perhaps most important, we noted repeatedly how important the cosmetics of a book are to beginners—and, equally significant, how much less important these same cosmetics are to those who are no longer beginners.

DEVELOPING USABILITY

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Usability was a top concern in the development of manuals for IBM's SQL/Data System. This product is a new type of data base management system. It is designed for use by people not formally trained in data processing.

This paper focuses on four aspects of the writing effort:

1. Understanding the "user-friendly" nature of the product.
2. Writing with the product's users and their tasks uppermost in mind.
3. Working closely with programmers, educators, and human factors specialists.
4. Using the product to document itself.

Each of these aspects made the final manuals more usable. The vital aspect of testing the manuals is described in R. H. Kerr's paper *Testing Usability.*

User-Friendly Nature of the System

The SQL/Data System is used to store and retrieve data. All data is seen as tables; this *rows and columns* approach makes it easy to visualize the data. (A telephone book is a common example.)

A person no longer needs to learn programming to store and maintain records on a computer. The Structured Query Language (SQL) one uses to control the system is very natural for English-speaking persons. For example, the structure of a query is:

```
SELECT some data (names of columns)
  FROM some place (names of tables)
 WHERE some conditions exist (if any)
```

Using this language, a novice can formulate a query directly; he doesn't need a data processing department to write special programs for his day-to-day needs. This system is convenient for persons whose needs (queries) change often. This way of using a data base is called *ad hoc* query. Figure 1 shows some example queries.

These examples just scratch the surface of the system's capabilities. (For example, built-in functions, such as AVERAGE, are included for use in analyzing numerical data.) A user can also adjust the layout of a result to create a nicely formatted report.

The main point, however, is that this system is much easier to use than its IBM predecessors; they demanded fully trained data processing personnel. This system requires minimal education for its users; it is much more flexible than earlier IBM data base systems.

User Task Orientation

Concern for *the user* dominated the development effort for both the system and the manuals. The term *user* includes many different kinds of persons:

- Executives who decide if their company should try the system.
- Technical experts who oversee the installation and use of the system.
- Terminal users, many of whom are untrained in data processing.
- Data processing professionals, such as system analysts and programmers.
- Diagnostic programmers who investigate problems in the system.

Our first job was to adapt the IBM guidelines on library structure to our specific system and it users. Figure 2 shows how we structured the library for our users.

We also set goals for the library. For example:

- Emphasize how to use the system, not how the system works.
- Minimize the number of new and changed terms.
- Favor tutorial writing style over the reference book approach.
- Limit the page count so that manuals can be handled easily. A large library suggests that the system is not easy to use.
- Give the key facts about the system; ensure that facts of lesser value do not obscure the important ones.
- Provide reference text in both printed and online format, thus giving terminal users a choice of media.

We also developed measurable criteria for testing each manual. These factors and the testing are the subject of R. H. Kerr's paper.

Working with Others

In previous projects the writers dealt almost solely with the programmers for inputs and reviews. In this project we enlarged our scope. We began working with other groups in new ways.

The People

The writers gained from the close cooperation that developed among the people working on the project. This included programmers, educators, and human factors specialists. (Programmers have varied areas of specialty; for example, development, testing, performance, and service.)

Programmers

The development programmers were the best source of information on how the system worked. The writers acquired this information in a variety of ways — from studying specifications to informal discussions. Informal conversations often yield the best information.

Consider two tables, named PARTICIPANTS and MEETINGS:

PARTICIPANTS:

```
PERSON COMPANY ADDRESS       ROLE      STEMID PAPER
------ ------- ------------  --------- ------ ---------------------
SCOTT  IBM     ENDICOTT, NY  SPEAKER   WE5    DEVELOPING USABILITY
BENSON ZZZ     MAINTON, TX   SPEAKER   WE6    CREATIVE EDITING
KERR   IBM     ENDICOTT, NY  SPEAKER   WE5    TESTING USABILITY
JONES  XXX     NORWALK, CN   MODERATOR WE5    NONE
```

MEETINGS:

```
STEMID   PLACE                TITLE
------   -----------------    -------------------------
CM1      BALLROOM             BETTER MANAGEMENT
WE1      REGENCY ROOM         CREATIVE EDITING
WE5      CONFERENCE ROOM 1    ACHIEVING USABILITY
WE8      CONFERENCE ROOM 4    QUALITY DEVELOPMENT TOOLS

QUESTION:  What companies are providing speakers?
ACTION:    SELECT DISTINCT COMPANY
               FROM PARTICIPANTS

TASK:  Move the session on Creative Editing into the Main Hall.
ACTION:   UPDATE MEETINGS
              SET PLACE = 'MAIN HALL'
              WHERE TITLE = 'CREATIVE EDITING'

QUESTION:  What papers are to be delivered in the Ballroom?
ACTION:   SELECT  PAPER, PERSON, MEETINGS.STEMID
              FROM PARTICIPANTS, MEETINGS
              WHERE PARTICIPANTS.STEMID = MEETINGS.STEMID
                AND PLACE = 'BALLROOM'
              ORDER BY 3
```

Figure 1. Some Examples of SQL Queries

Educators

Our work with the educators was mutually helpful. Education planners reviewed early drafts of the manuals. They made many suggestions as they developed their courses. They were especially concerned for the novice users of the system. By making the manuals easier to learn from, they made the manuals more *self-sufficient*.

They also reduced the need for formal classroom courses. As a result, the system is easier to use and less costly. The appeal of a system is lessened if its users must first receive lengthy formal training. Training takes time and increases the cost to the customer.

Human Factors Specialists

A member of the writing group and the human factors people developed and conducted the usability tests of the manuals. The testing added a new aspect to the writing process. We became more sensitive to a fact of life: ease of use, like beauty, is in the eye of the beholder. The test results led us to further edit and rewrite large parts of our manuals.

Other writing groups in IBM are also placing more emphasis on human factors aspects.

The Processes

Improved processes also contributed to the project's success.

Inspections

In previous projects, writers created drafts and sent them out for review; the writers would later collate the resulting comments and that would be that. However, little or no interaction occurred among the reviewers. Inspection meetings changed all that.

The inspection process entails sending drafts for review as before; but then we hold an inspection meeting at which the reviewers give their comments. Usually, each organization sends one representative; these included:

- Development Programming
- Publications
- Human Factors
- Field Engineering
- Product Planning
- Marketing
- Education

The meeting is conducted by a moderator (typically the publication planner). The moderator guides the reviewers page by page through the draft. Every necessary change is noted. Each is either agreed to or listed for later resolution. Such meetings not only correct errors, but also correct misconceptions on the operation of the system. The interaction between the reviewers is most valuable.

Message Reviews

Writers were also members of the Message Review Committee. The value of the messages that a computer program issues is a big factor in its usability. Here the writers contributed their user-orientation. They sought to make the messages easier to understand. In particular, they worked to make the messages more meaningful to persons not trained in data processing. Writers can see the system from the outside in; they balance the programmers, who often see the system from the inside out.

Publication Testing

Usability tests on the manuals were conducted jointly by writing and human factors personnel. Programming provided a test version of the system for use by the test subjects. Those tests are described in R. H. Kerr's paper.

Task	Person	Manuals Provided
Evaluation	Customer Executive	The *General Information* manual is a non-technical overview of the system. (The *Concepts and Facilities* manual is a technical overview.) The *Licensed Program Specifications* flyer includes information on program specifications and its specified operating environment.
Planning	Data Base Administrator	The *Planning and Administration* manual describes the planning considerations and administrative options offered by the system.
Installing	Installer	The *Installation* manual gives the step-by-step process of putting the system into a computer.
Application Programming	Programmer	The *Application Programming* manual explains how to imbed SQL commands in a user-written program.
End Use	Terminal User	The *Terminal User's Guide* is a tutorial on how to use the system from a computer terminal. Many examples and exercises are included. Color is used to highlight entries that the user is to make. The *Terminal User's Reference* is the manual to which the novice terminal user moves after finishing the *Guide*. This manual is arranged in alphabetic order by command. The *Terminal User's Reference Summary* is a folding card showing the structure of each command. The *Program Function Key Template* is a plastic template that fits around a special group of 12 keys on the terminal. It helps the user remember the functions of those keys. The Help Text is taken from the *Terminal User's Reference* manual and the *Messages and Codes* manual. The terminal user can display the Help Text for any topic by using the HELP command.
Operation	Computer Operator	The *Operation* manual summarizes the system from the operator's point of view. It explains the commands by which the operator can control the system.
Program Service	Diagnostician (System Programmer or IBM Field Engineer)	The 2-volume *Logic* manual explains the internal operation of the system. It explains diagnostic tools and gives a considerable amount of reference information.
Cross-Task Publications	Various Users	The *Concepts and Facilities* is a technical overview of the system. It is the beginning manual for data processing professionals. The *Messages and Codes* manual explains every message and error code which the system can generate. This manual is for anyone seeking more detail on a message/code and advice on how to respond. The *Master Index* brings together the indexes of the other manuals (except the *Logic* manual). This index helps users who are not sure where to look for topics in the library.

Figure 2. Publications for Each Task

Early User Comments

The writers also benefitted from comments by early customers. The users' responses were favorable. We used that experience to improve the system and the manuals. In particular:

- Minor flaws in the system were discovered and repaired.
- Manuals were revised for greater clarity and technical accuracy.
- The consolidated index was added to the library.

Additional comments continue to come to us via IBM's normal Reader Comment Form, a postage-paid mailer at the back of each manual.

Using the System to Document Itself

The writers benefitted initially by having a working prototype of the system available to them. This speeded their education. It also gave them a way to test the examples they wrote for the manuals. By putting themselves in a user's place, they could better understand the user's view of the system. The resulting manuals grew out of that understanding.

Since a data base system is a means for storing and retrieving data, it seemed natural to place information *about* the system *in* the system. Providing a complete computer-assisted instruction package was rejected because of cost and complexity. However, a simple group of aids was developed. An installed system now contains three types of aids for users:

Help Text
Sample Tables
Sample Programs

Help Text

If a terminal user needs aid in writing a query or interpreting an error message, he can turn to the Help Text. The Help Text is material copied from the *Messages and Codes* and the *Terminal User's Reference*. The Help Text is built from the same word-processing files as the printed manuals. This structure eases the writer's task of changing the files. The online display of the printed material reinforces the facts.

Sample Tables

Sample tables of data are included in the system to help in user education. The tutorial *Terminal User's Guide* is meant to be used at a terminal. The new user is to read the manual and do the exercises using his own copy of the sample tables. The user goes through the tutorial at his own pace, displaying and changing the tables as directed by the *Guide*. This type of education is very effective. The user deals directly with the system, not a reference book abstraction. This *hands-on* method builds the user's competence and confidence.

Sample Programs

All readers seem to love examples. A generous supply was provided in each manual. Yet users say they want more of them, especially more complex ones.

The *Application Programming* manual documents the sample programs in the system. The samples integrate many of the ideas presented in that manual. The samples can be run by the programmers at the customer location. The programs load and operate on the sample tables.

Similarly, the *Terminal User's Reference* includes example of routines that a user can create at a terminal. A routine is a series of commands that can be invoked as a unit; a common example would be a routine to create, format, and print a series of monthly reports.

Summary

Given a system whose primary appeal is its ease of use, the writers focused on the tasks that users would do with the system. Close cooperation in the development team led to a library of manuals and online information suited to the needs of the users. Early users have cited the result as one of IBM's best.

WRITERS/EDITORS AS INTERVIEWERS, OR THE ART OF INTERVIEWING: HOW TO PLAY "TWENTY QUESTIONS" AND GET GOOD ANSWERS WITH THE TAPE RECORDER RUNNING*

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ABSTRACT

To conduct a successful journalistic interview, the interviewer must do a lot more than just ask questions. The interviewer must act as a conduit in the interview, drawing in and channeling the information for an audience. Such a burden is enough to cause any novice questioner to freeze up in the face of "The Interview." To shrink the task to manageable proportions, the interviewer can break down the interview into three phases: preparing the groundwork, getting down to business, and wrapping it up. The interviewer also needs to remember that conducting a successful interview is an art: a combination of technique, intuition, practice, and style. Applying the art of interviewing to all three phases can help make the interviewing experience a fruitful one for you, the interviewer, and a pleasant one for all participants.

INTRODUCTION

Whether you realize it or not, you probably conduct interviews all the time in your daily life. You are interviewing when you talk to an author to get more information about a paper in progress, ask your supervisor about the particulars of a new project, or quiz the kids as to who put the frog in the dishwasher. But "interviewing" takes on an entirely different light when you must interview the head of your department and then write up an article/press release/report on your results. Suddenly, the simple act of asking questions and interpreting information can assume awesome proportions.

When I first realized I'd have to interview people and write articles for *Engineering News*—an in-house newspaper for the engineering departments of Lawrence Livermore National Laboratory—I panicked: "How do I **interview** someone? What do I say? What do I look for? How should I act??" I scurried off to get advice from an expert who had been interviewing and writing journalistic/newspaper-style articles for years. I came away from that first interview armed with the five w's and one h (who, what, where, when, why, and how) and, written in big letters in my notebook, "GET MORE INFORMATION THAN YOU CAN POSSIBLY USE." Thus, my style of interviewing developed from the belief: "Get 'em talking and keep'em talking until they run out of things to say." In those early days, I always got the information. . . albeit buried in reams of notes and transcribed tapes. Four years later, I no longer require massive amounts of tape for my tape recorder, but my style is still based on the "let's be friends and just chat" approach (used by interviewing luminaries such as Studs Terkel) as opposed to the "I'm gonna hit you with every tough question I can think of and push you until you answer" approach (think of the style of some television interviewers).

No matter what style you prefer, you can make the process of interviewing easier by considering the interview as three parts: preparing for the interview, getting down to business, and wrapping it up. In each phase, you can follow certain techniques and be alert for clues that will help make the experience profitable for you and a pleasant one for everyone. As a proponent of the "let's be friends" technique, my suggestions are intended to establish and maintain a good rapport between you and the interviewee. These techniques, along with your own intuition and style, form the art of interviewing.

PREPARING FOR THE INTERVIEW (or, Check your premise and your batteries)

Before you breeze into the victim's office, tape recorder and questions at the ready, you need to do your groundwork. First, decide on your topic and on your angle, and determine who you need to talk to. For instance, suppose your topic is the newly installed super-computer that was designed and engineered by your engineering department. What sort of an article are you going to write? Are you going to write a straight news story (the "who, what, where, when, why, and how" of the project) or are you going to write a human interest article about the project from the point of view of the technicians (who worked 10 hours a day to get the new prototype installed), or of the engineers (who have been with the project from its inception), or of your department head (who sees the project in relation to other department projects)? Once you have an angle, you can pick your first contact. You may find that your first interview leads to further contacts and interviews.

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*Work performed under the auspices of the U.S. Department of Energy by the UCLLNL under contract number W-7405-ENG-48.

Next, contact your initial interviewee and set up the mechanics of the interview. How you handle this first contact—usually in the form of a telephone conversation—is very important. Your would-be interviewee will form an immediate (and hard to change) impression about you based on this short conversation, so you want to come across as friendly and professional. Introduce yourself (who you are and where you work), and explain what you want information about and what it's for (an in-house newspaper article? press release? etc). A warning: the word "interview" can sound threatening to some people; saying you want to talk with them sounds more friendly and less forbidding. You can then discuss where to meet (I usually suggest the interviewee's office, just to make it more comfortable for him or her) and for about how long. If you haven't done much interviewing before, estimating the time needed can be difficult. For an initial interview, I usually ask for an hour and use about forty-five minutes, depending on the topic and how garrulous the person is. While you have your contact on the phone, also find out if he or she has any special "surprises" in store for you: will there be a tour? Will there be more than just that one person there? (When you're expecting to interview only one person, it's disconcerting to walk into an office and find five waiting for you.) If you plan to bring a tape recorder and/or a camera with you, be sure to say so in the conversation. Don't spring any surprises on your interviewee. My personal philosophy—here at the beginning as throughout the interview—is to keep the entire experience pleasant and natural, both for me and for the person I'm talking to.

After your phone conversation and before the actual meeting, you will probably want to do some additional research on your topic. Your research may help you narrow down a large topic, give you that angle, and aid in preparing concise questions (particularly valuable if your contact can only spare fifteen minutes to talk). Since I usually write non-technical articles on technical topics, it's easier for me to prepare just general questions to get the person going. I find that a minimum amount of research allows me to approach the topic with few preconceived ideas.

In addition to this mental preparation, you need to prepare yourself in other ways as well. Be sure your equipment—your camera (if you bring one), and especially your tape recorder—is working before you walk through the door. Do you have enough tape? ("Enough" is often more than you think you'll use.) Are the batteries fully charged? Do you have extras in case they die during the interview? This physical preparation also includes considering what is proper attire for the occasion. You want to be professional, and you also want to be "in tune" with your interviewees, their expectations, and the environment. For instance, the tailored suit and high heels I would probably wear to conduct an interview in the company president's office would not be appropriate to an in-the-field interview at a construction site.

GETTING DOWN TO BUSINESS (or, Playing "Twenty Questions" with aplomb)

After you walk into the office and shake hands, don't plunge immediately into your carefully prepared list of questions. Take a few minutes to establish rapport and put your interviewee (and yourself!) at ease. That rapport—how you get it and how you use it—is part of the art of interviewing. Introduce yourself and indulge in some small talk (about your newspaper, the weather, etc.). Look around the office; you may see something to remark on—a photograph or a plaque—that will help you break the ice.

In these initial moments, you're actually borrowing a technique used by many successful salespeople. Their success in establishing rapport with a customer stems partly from their "chameleon-like ability to pace the language and thought of any customer."[1] A good salesman or saleswoman does not plunge immediately into a sales pitch; he or she first establishes areas of agreement with the customers, builds their trust, and puts them at ease. You want to do the same in your interview. So, try to discover what kind of a person you're talking to: the no-nonsense type who wants to get right down to business or the easy-going type who feels more comfortable with a lighter, less serious approach? Approach the interviewee on an appropriate level. If you can do this, the interview will be comfortable for you both, more like a conversation than an inquisition.

Once you have created the proper atmosphere, the real work begins. And interviewing **is** work. You need to ask the right questions, listen carefully to the answers, be aware of both verbal and non-verbal clues, and respond appropriately. How you handle this complex interaction is more art than science, but there are some concrete points you can keep in mind. When you are preparing and asking your questions, be sure they are questions that evoke more than "yes" or "no" answers. Be an active listener; occasionally repeat back what you've heard to make sure that you understand ("What you're saying is. . . ." etc.). Don't be afraid to ask for more explanation, or to say that you don't understand. Remember, if **you** don't understand, you will have a difficult time explaining it to the audience you're writing for. Be alert for clues that may lead you to ask other questions. A passing remark, a change of voice, a joke that's not really a joke. . . these can be conscious or unconscious signals indicating that the person you're interviewing may be waiting for you to ask: "What do you mean by that?" Sometimes, silence can be your best ally. A common journalistic ploy (which works!) is to nod a couple of times and look expectant after your interviewee has finished a statement. After a few, quiet moments most people will say something, anything to interrupt the slight, scratchy sound of the tape recorder recording silence.

Finally, here are some additional suggestions to help make your interview go smoothly:

- Ask general questions first, then move to the specifics.
- Don't interrupt. Wait until the person is finished talking before you speak.
- Take notes, even if you tape the interview. Most people still expect an interviewer to take notes and may feel uncomfortable if they don't see you actively scribbling away or jotting down an occasional key word. You can jot down further questions as they occur to you during the interview.
- Change the pace of your interview as you go along. After a hard question, lean back, relax, and ask an easy one. This gives your interviewee a break. (It's hard work for them too!)
- Ask for examples and analogies that will help make a point clear to your audience. This is particularly important in writing non-technical articles on technical subjects. Get into the habit of asking questions like: "So this crane can lift nine tons. . . how many cars does that equal?" or "So this fusion process uses 200 trillion watts. . . how many 50-watt lightbulbs will that power?"

- Learn to seek out the anecdote. Anecdotes are often the highlights of an article. Learning to draw out the stories takes practice. Generally, the more at ease people feel, the easier it is for them to fall into the story-telling mode.
- Learn how to rephrase a question in different ways. This is very helpful when you ask a question, and the answer you get isn't really an answer.
- Know when to close the interview. This leads to the final phase of an interviewing session. . .

WRAPPING IT UP (or, Making a graceful exit)

Most interviews have a natural "winding down" that you can sense. This is a good time to check through your notes for missed or forgotten questions and to ask: "Is there anything else you'd like to add?" In closing an interview, be sure you leave a connection. Don't just thank them and disappear, never to be heard from again. Let them know that you'll be back in touch to take photographs, to take that proffered tour, to ask questions if you think of something you missed, etc. Finish up in the same way you began, a few conversational remarks that will tell your interviewee that the ordeal is over.

Often, something very interesting happens at this stage of the interview. Just as you turn off the tape recorder, close your notebook and stand to leave, the person will come out with the best quote of the interview. Don't panic, don't turn on the recorder and pray for more. . . just pay close attention, say good-bye, dash down the hallway and around the corner, and write it down!

CONCLUSION

Addressing the interview in three parts—preparing for the interview, getting down to business, and wrapping it up—is one way for a novice interviewer to get a handle on what can be a harrowing situation. And, as is true with most things, the more you practice the better (and more comfortable) you will become with the interviewing process. As your familiarity with the process increases, you'll have more energy to spare for the person you're interviewing. You will become more sensitive to verbal and non-verbal clues, respond more appropriately, and, as a result, learn more about the person you're interviewing and about the topic under discussion. But, no matter whether you are preparing for your first or hundredth interview, remember that your interviewee is giving you a gift of time and information, and deserves your gratitude and your courtesy. Studs Terkel says it well in his book *Working:* "I was no more than a wayfaring stranger, taking much and giving little. . . I was the beneficiary of others' generosity. My tape recorder, as ubiquitous as the carpenter's tool chest or the doctor's black satchel, carried away valuables beyond worth."[2]

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THE ROLE OF THE TECHNICAL COMMUNICATOR AS PUBLIC RELATIONS AGENT IN THE SCIENTIFIC OR TECHNOLOGICAL BREAKTHROUGH
STAGE I

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As scientific and technological breakthroughs continue to increase along with the public's desire to learn about them, the technical writer is being called upon more frequently to act as a Public Relations Agent (PRA) to initialize the information flow of the breakthrough. This news eventually reaches specialized and later general audiences through editors in the news media.

Editors of scientific, popular and general interest magazines and producers of television and radio shows represent the first audience other than the researcher's peers to receive news of the scientific or technological breakthrough. At this stage, as the PRA sends press releases, public service announcements and other information about the breakthrough to editors, he or she has most control over the information and can check and re-check the information for accuracy before it even reaches editors. The PRA works directly with the researcher to gather information, interviewing him or her, and perhaps using articles the researcher has published about his work in academic journals relating to his field.

The work of Carol Siyahi, assistant director in the Office of Communications at Wright State University, as a PRA for Dr. Jerrold Petrofsky, an associate professor of biomedical-engineering and physiology at Wright State, whose research could eventually enable the paralyzed to move again, shall serve as a concrete example of this theory working in reality.

An editor of a newspaper finally finds time for a small break from the pressure to meet the newspaper's deadline. As he relaxes in his chair, he notices a stack of papers which have been accumulating on the far corner of his desk for a week. The papers are press releases which he has received from local businesses, universities and public interest groups. As he sifts through them, he throws many away, and puts a few aside to be rewritten, in much briefer form, and printed in the paper when there is room. He saves a few to be printed as is, but, once again, only when there is room. Only one, on a significant scientific breakthrough recently made at a local university, gets the editor's full attention. This release he reads with much interest, wondering if there is time for a reporter to find out more about it before deadline so that the information can be used in tomorrow's morning paper . . .

A woman, sipping her morning coffee, sits down at the kitchen table with the local morning newspaper. She glances through the paper, reading mostly headlines and the first part of the news articles, until she spots a headline which captures her interest. The article deals with a significant scientific breakthrough at the local university. She does not know that what she is reading has been rewritten in part, but printed mostly as is, from a press release sent to the newspaper from the university.

The above illustrations show the possible results of the work of a public relations agent (PRA) who functions also as a technical communicator to publicize a scientific breakthrough. More specifically, these sketches show stage I of the PRA's work in the process of communicating a scientific or technical breakthrough. The first audience the PRA must reach is that of newspaper editors. It is only after first convincing editors, by means of effective press releases, often accompanied by photographs, that the PRA can begin to reach the audiences of stages II and III of the communication flow of the breakthrough. In stage II, the audience is readers of popular culture and science and technology magazines. Viewers of the mass media, for example, of news shows, constitute the audience of stage III.

Before these audiences are reached, however, the technical communicator as PRA must fulfill stage I of the communication flow, by writing press releases based on personal interviews with the researcher behind the technical breakthrough and by reading and studying the articles published by the researcher in academic journals of his or her field.

The PRA, when serving as the catalyst of the communication flow of a scientific or technical breakthrough, is indeed a technical writer, and must understand clearly and correctly the information gotten from the researcher and articles written by the researcher. It is important to note that if it were not for the technical writer/PRA, information on such breakthroughs would often circulate only among the researcher's colleagues in articles written by the researcher for academic journals of his or her field and at academic conferences relating to the researcher's field of study.

The PRA brings the news of the breakthrough, or of significant research leading to an important scientific or technical breakthrough, to the attention, firstly, of local or regional newspaper editors, by sending the editors a press release. In stage I of the process, the PRA has most control over the information. He or she deals directly with the researcher and the researcher's work for the information, and then conveys this information to local newspaper editors, who the PRA may often know.

Editors of newspapers, under the pressure of deadline, may often run the release as is, or with minimal rewriting. Thus, the work of the PRA is preserved, even when in print in a newspaper.

In stage II of the process, editors of popular culture and science and technology magazines have more time to use the information on the breakthrough as a basis for a more in-depth story. These editors may use the press release, which they too have received from the PRA, and/or a newspaper article printed from the press release as a brief story in their publication. But, if they wish to do an in-depth story, the press release and/or news article becomes background information and these editors contact the PRA for an interview with the researcher. The PRA's control over the information, and his ability to check for accuracy of the technical information has lessened, for in stage II, all information is not taken from the press release which the technical writer as PRA has written carefully, using his skills as a technical writer to insure its accuracy. Editors of the magazines in stage II rely less on the PRA for information than does the editor of stage I, lessening the PRA's control over information.

As the communication flow continues to stage III, the control of the PRA lessens further, for in stage III, the mass media relies mainly upon the PRA as a mediator between the researcher and the producers of mass media. The PRA's work is used only as a tip for a news story by the producers and the PRA has little control over what is aired.

The importance of the technical writer as PRA in a scientific or technical breakthrough in stage I of the communication process is the concern of this paper. This paper examines the growing need for technical writers to serve as PRAs in starting the communication flow of a scientific or technical breakthrough, the methods of the technical writer as PRA used in stage I of this process, the difficulties the PRA encounters in stage I, and the control held by the PRA over the communication flow during stage I.

THEORY

Need for PRA, Stage I

We live in a world of fast paced change--in our institutions, beliefs and social structures--and in a world of fast new developments--in theories, products, science, medicine and technology. Not only does our world change quickly, but its rate of change is constantly accelerating. As Cutlip and Center pointed out in their book, Effective Public Relations, "This generation has had to grapple with adjustments to mass communication, the automobile, the jet aircraft, data processing, automation, nuclear energy, earth satellites, and space travel among others. Lack of human ability to keep pace with this fast-flowing change has produced maladjustments aplenty. This harsh fact, too, has implications for the function of public relations. Introduction of change brings the need for winning acceptance of new ideas, new products, new ways of doing things." (1971, p. 108)

This statement holds true especially for the scientific and technological areas. Researchers making breakthroughs in these areas barely have time to share their findings and progress with their colleagues; they certainly do not have time to wage their own publicity campaign. If the information of a breakthrough, or a scientist's progress toward a breakthrough, is to be made known to the public, it is up to the PRA to make it known. The PRA must combine his skills as a PRA and the skills of a technical communicator as he begins initializing the communication flow as represented by stages I, II and III of our theory.

As more scientific and technological breakthroughs and developments occur, "assisting institutions and individuals in coping with change is increasingly the task in public relation." (Cutlip and Center, 1971, p. 99) Technical communicators have traditionally translated often highly technical language about a product into readable, clear, precise language in manuals or documentation explaining to the lay person or mechanic, for example, how to operate or fix something. Now, as more and more breakthroughs in science and technology occur, technical communicators are needed to serve as a PRA for the researcher or company behind the breakthrough, insuring that from clear technical writing in press releases the news media can understand well the breakthrough in order to pass the knowledge onto its readers or viewers. Or, the PRA, if not already a trained technical communicator, must develop the skills of a technical writer to effectively do his job.

In stage I of the communication flow, the PRA, then, must combine the craft of the technical writer with the skills of the public relations agent as he initializes the flow with press releases and deals with the audience of newspaper editors.

The PRA's Methods, Stage I

The press release is the most often used method of initializing the breakthrough or impending breakthrough. Once scientific or technological research has led to a full breakthrough, a news conference may be desirable. As Cutlip and Center point out (1971, p. 417), "In this era of science, complex matters which require backgrounding, such as a technological breakthrough, often justify a conference."

"Backgrounding" is also essential in a press release but the PRA must be careful to answer in the first sentence or paragraph the newspaperman's traditional six questions: who, what, where, when, why, how. The challenge for the PRA is to answer those questions with technical correctness but in clear, newspaper language. (This difficulty is discussed in further detail under the next subsection.) Because the newspaper editor is already flooded with many press releases, a press release with an interesting twist to those six questions is often desirable. However, interest of an important scientific or technological breakthrough will almost always speak for itself. Photos which will catch the editors'--and later, the readers'--eye are especially important to send with a press release if the breakthrough or developing breakthrough is one which can be shown in action.

As with any PRA, the PRA of a breakthrough must deal openly, honestly and politely with the newspaper editor, considering his time and his needs for and space in his newspaper. However, the technical writer as PRA in a scientific breakthrough must also be careful to be considerate of the researcher's time in scheduling personal interviews with the press. Because the researcher may not have the time to or is unwilling to meet with the press personally, the PRA must often answer the questions of the press. This means the PRA must keep an accurate, precise, up-to-date understanding of the developing breakthrough, making absolutely sure of the facts.

The PRA's Difficulties, Stage I

The PRA's major difficulty, in terms of functioning as a technical writer, is in stage I, at the point when the PRA sits down to actually begin writing the press release. At this point, the PRA faces the difficulties of the technical writer dealing with the fact that "Each specialization has its own particular language, and this raises communication barriers. Specialists need translators of their jargon to communicate across their narrowing boundaries." (Cutlip and Center, 1971, pp. 108-109)

Because the PRA must act as a very clear, accurate "translator" of scientific terminology as he initializes the communication flow of the breakthrough, he functions as a technical writer.

For the PRA concerned with writing the technically accurate press release, this often means long hours of research, many return trips to the researcher (no matter how embarrassing the number of these trips may seem to become) and much time spent crafting an accurate press release. Information on highly technical, complex breakthroughs must be rendered clearly, without loss of accuracy, in only a one to two page release.

The PRA's Information Control, Stage I

At stage I of the communication flow, the PRA has the greatest control over the information. He decides what information is most essential to accurately portray the breakthrough as he initializes the communication process with a press release.

The PRA also maintains greater control over how the information is used by newspaper editors in stage I of the process than he does over how it is used in other stages. This is because local newspapers often run press releases as is, or do little rewriting of the release before sending it to print as a news article.

This depends also, of course, on how well the release is written. The release should be written well enough that if the editor, for example, under pressure of deadline and needs for newspaper space, decides to print all but the last two paragraphs of the release, then the information in the release will still be clear, understandable and accurate.

APPLICATIONS

The work of Carol Siyahi, assistant director in the Office of Communications at Wright State University in Dayton, Ohio as a PRA for Dr. Jerrold Petrofsky, an associate professor of biomedical engineering and physiology at Wright State, serves as an illustration of our theory.

Petrofsky, also director of the biomedical engineering laboratories at Wright State, has worked since 1968 on a project which could someday enable the paralyzed to again walk, which, as Siyahi has written in a recent article in the WrightStater, Wright State's alumni newsmagazine, "has already achieved some major breakthroughs, including getting individuals paralyzed from spinal injuries to pedal a stationary bicycle and outdoor tricycle. The individuals in both instances are assisted by Petrofsky's computerized electrical stimulation-feedback system, which is capable of producing controlled coordinated movement in the legs of paralyzed people."

Most recently, Nan Davis, a paralyzed test subject, was enabled to walk for a short distance on the campus of Wright State University by means of Petrofsky's system.

Since 1980, Siyahi has written press releases on Petrofsky's progress as it has developed, from Petrofsky's ability to get a paralyzed animal to move again to the breakthroughs described above. Her work in publicizing Petrofsky's research captured first the attention of local newspapers such as the Dayton Daily News. Clippings are kept in the WSU Office of Communications of local newspaper articles printed from the news releases. Then other newspapers across the country, such as the Washington Post, via news wire services, national magazines such as Discover, and magazines in France, West Germany and Australia picked up the story.

The television media have also picked up the story initialized by Siyahi's work. ABC's "Good Morning America" filmed the first ride on a tricycle by a paralyzed person, made possible by Petrofsky's work. Both the "NBC Nightly News" and the CBS show, "60 Minutes," have aired reports on Petrofsky's work this television season.

The implications of the wide coverage of a major breakthrough such as Petrofsky's will be covered in the papers on stages II and III of the communication flow of a breakthrough.

But, at the root of the ever-increasing communication flow of Petrofsky's work is Siyahi working, always, in stage I, to initilize again and again the communication flow of Petrofsky's work. She works endlessly translating the highly technical developments of Petrofsky's work into clearly understandable and accurate press releases.

DISCUSSION

Siyahi's work, as discussed in the above section, bears out in reality the theory of the PRA working as both a PRA and a technical communicator in the process of publicizing a scientific breakthrough.

Like any PRA dealing with the scientific breakthrough, Siyahi had to first initialize the communication flow with press releases explaining, in only two pages, the work of Petrofsky. By translating into understandable, clear and accurate information Petrofsky's work, Siyahi works as both a technical writer and as a PRA.

Without Siyahi's work at the root of the communication flow in stage I, Petrofsky's work would not have been likely to receive the massive media attention it has drawn.

CONCLUSION

As more and more scientific breakthroughs occur, the PRA will be called upon to develop the skills of the technical communicator. The technical communicator may, indeed, be hired by research groups, companies and universities to work as a PRA so that these institutions' scientific breakthroughs will be presented to the public in accurate and clear technically correct language.

The technical communicator must initialize the flow at the stage I level of the communication flow of a scientific or technical breakthrough, using both the craft of the technical writer and the skills of the PRA if the flow is to be successful in reaching, finally, the audience of the mass media at stage III.

THE ROLE OF THE TECHNICAL COMMUNICATOR IN THE SCIENTIFIC OR TECHNOLOGICAL BREAKTHROUGH AS PUBLIC RELATIONS AGENT STAGE II

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As scientific and technological breakthroughs take place, the role of the technical communicator varies at different points along the process. Usually, such breakthroughs occur at the level of industry or universities. Only after the academic world (or experts) has been informed and the work approved at that level, does it become necessary to inform the general public. For example, the news of Dr. Jerrold Petrofsky's (Biomedical Engineer, Wright State University, Dayton, Ohio) work with microprocessors in limb movement of spinal cord-injured patients is being sent to editors via a Public Relations Agent (PRA). It is at this level that two distinct audiences can be identified as subsets of the mass audience: 1.) the general public audience which includes laypeople (persons without background) and 2.) the specialized audience (persons with a common interest or orientation). Editors of specialized media (i.e., science magazines like Discover, Science, and Science Digest) receive news releases from a public relations (PR) source nearest the point of discovery. The editor, if interested in further information, then sends writers back to the PRA for more in-depth information. Because of the background knowledge of the specialized audience in the particular area, the PRA is more open about releasing technical information, primarily because there is a lesser chance of distortion of the information, than at the level of the general public. In conclusion, the PRA at the level of the specialized audience has more control because of the background of the audience and writers (communicators); therefore, there is less chance for distortion of the facts.

Within the past two decades, numerous scientific and technological breakthroughs have taken place. With computers and other sophisticated forms of devices being used in research, each breakthrough appears to be more complex. Therefore, the role of the technical communicator as Public Relations Agent (PRA) is very important in relating the information about the breakthrough to the mass audience.

The mass audience basically consists of two subsets: the specialized (popular culture) audience and the general public (mass media) audience. These two groups differ in the amount of knowledge each has in the area related to the breakthrough. As a result, a theory of the role of the technical communicator as PRA and the way the PRA communicates with these two audiences, mainly the specialized audience, has been devised.

THEORY

As most scientific and technological breakthroughs take place in either industry or universities, there is usually a technical communicator in the role of a public relations agent (PRA) involved in the transmission of the information.

Initially, the researcher presents his ideas to his peers through academic journals. Once the researcher's ideas have been accepted on this level, he then makes contact with the PRA who, in turn, sends out very brief press releases concerning the discovery to the news media, dealing with both the specialized and general audiences. The PRA must be able to have a very good understanding of the breakthrough so as to write the brief, but accurate press releases.

The editors receiving press releases at both levels (popular culture and mass media) are in control of their readers even finding out of the discovery through their "specific" medium. If the editor does wish more information, he must contact the PRA. The PRA determines the amount of control to be placed on the amount and type of information released. Since persons in the popular culture area have more background of the area involved (i.e., science, due to some general or specific courses in their past, books and articles read on the area, etc.), the PRA can feel more free to release more technical information, as the amount of distortion should be reduced.

The PRA, however, is probably less inclined to give detailed information to the editors in the mass media. These editors must relay very technical information to persons having a great deal of background to persons having little or no background in the area involved. In addition, the necessary background of communicators in this area to fully understand what is involved in the breakthrough is usually lacking. Therefore, more distortion is likely to take place in the process of information transfer from the PRA to the mass media audience.

During the filtering process of the information regarding the breakthrough, it is interesting to note that each audience becomes larger.

The Specialized Audience

According to J.C. Merrill, two distinct audiences can be identified as subsets of the mass audience. The first is the general public (mass media) audience which includes laypeople (persons without background) and the second is the specialized (popular culture) audience. In the latter, these persons have a common interest or orientation. Publications within this area include: Discover, Science News, and Science Digest. These specific publications are geared toward persons having some background or training in some area of science. For example, Science News is a 16-page weekly magazine written for scientists and science-oriented laypersons; it has a circulation of 175,000. Science Digest, yet another magazine, is a monthly of approximately 160,000 circulation. Writer's Market reports that Science Digest "emphasizes sciences and technologies for all ages with a scientific bent."

Editors of these specialized publications receive press releases from the PRA involved. If the editor so desires, he sends writers back to the PRA for more in-depth information. Because of the background of the writer (communicator), the PRA is more open about releasing the technical information related to the breakthrough. This happens primarily because there is a lesser chance of distortion of the information at this level than at the level of the general public (mass media).

In conclusion, the PRA at the level of the specialized (popular culture) audience has more control because of the background of the audience and writers (communicators); therefore, there is less chance for distortion of the facts.

APPLICATION

In the model of the filtering of information regarding a scientific or technological breakthrough, it is shown that the greatest amount of technical information is released to the specialized audience. However, with the general public audience, the PRA releases less information and there is a greater chance for distortion. Therefore, the PRA has less control over how the information is handled.

To demonstrate the application of the theory described, the works of Dr. Jerrold S. Petrofsky, associate professor of Biomedical Engineering and Physiology, Wright State University, Dayton, Ohio, have been selected as an example. Dr. Petrofsky is currently working with the implantation of microprocessors in spinal cord-injured persons to eventually assist them with limb mobility.

The PRA at Wright State University issued press releases to the mass audience: both the specialized and general audience subsets. Editors of media for both audiences have followed up on the press releases and news of Petrofsky's work has been carried in specialized publications, in newspapers, and on several network television shows.

DISCUSSION

In May 1981 and July 1982, Discover magazine carried articles concerning the work and research of Dr. Petrofsky. These articles explain his experiments in a technical way which can be understood by persons having a general background of the field.

Differences in information released to the specialized and general audience subsets can be seen when comparing the Discover articles to that of a newspaper article which appeared in The Plain Dealer (July 5, 1982), Cleveland, Ohio. Rather than discussing physical findings in the spinal cord-injured patients, an explanation of the electrodes, and a description of upcoming experiments as was done in Discover, the newspaper article gave a brief summary of Petrofsky's interests. In addition, some general interest comments about the assembly of the devices used and some information concerning additional grant monies were also mentioned in the newspaper article.

The first article which Discover did on Petrofsky's work explained some of the electrical experiments on cats. As can be seen by this and the type of article Discover ran in 1982, it is evident that more technical information was released by the PRA at Wright State University to the writers for the specialized publication, Discover. Less technical information was released to writers of the general audience (mass media).

CONCLUSION

The technical communicator as a PRA has a very important role in the dissemination of information regarding a scientific or technological breakthrough. This begins, however, only after the researcher has published in the journals related to his field.

The press releases are sent out via the PRA to the mass audience of which there are two subsets: the specialized and the general public. The PRA has more control over the information released for the specialized (popular culture) audience and will release more information to this group because of the background knowledge they have.

Less information is given to the general public (mass media) audience because of their lack of background in the area of the breakthrough. Therefore, at this level, there is more distortion of the information released by the PRA.

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THE ROLE OF THE TECHNICAL COMMUNICATOR AS PUBLIC RELATIONS AGENT IN THE SCIENTIFIC OR TECHNOLOGICAL BREAKTHROUGH - STAGE III

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Technical Communicators facilitate the transfer of technical information in one form or another. The Public Relations Agent (PRA) who coordinates the dissemination of technical information concerning scientific or technological breakthroughs must be considered a technical communicator. As a set of research findings is diffused across a larger audience, the informational control enjoyed by the PRA is diminished during each stage of the process. To illustrate this process, the publication of the findings resulting from Dr. Jerrold Petrofsky's research at Wright State University can be employed as a model. In Stage I the audience and information flow are completely controlled by the PRA. In Stage II the PRA must deal with a specialized but broader audience receiving information handled and interpreted by other communicators. Finally in Stage III, where the mass audience is generalized and the information is handled and simplified by many other communicators, the PRA has the least amount of control over the information flow. As the PRA loses control over the channels of communication and the sizes of the audience, he/she will release less and less information to be publicized. Unintentional distortion may result from the dissemination of less technical and more generalized information. This paper examines Stage III of this process, paying particular attention to the effects that audience size has on the information flow.

Technical Communication is unique in that it usually takes place in an organizational context and it usually entails the representing or clarifying of highly technical information. In general, Technical Communicators (TCs) facilitate the transfer of technical information in one form or another. At the same time, the roles of TCs vary greatly in the communication process. For example, the Public Relations Agent (PRA) who coordinates the dissemination of information concerning scientific or technological breakthroughs is considered a technical communicator. This paper will examine exactly how a public relations agent acts as a technical communicator in such a process.

The dissemination process has been divided into three stages (See Figure 1 below) based upon the role of the PRA in controlling the information flow, the characteristics of various audiences, and the type of information diffused across those audiences. Three stages are employed because the conditions mentioned above change markedly at three different points in the information flow. This theory asserts that as a set of research findings is diffused across a larger audience, the informational control enjoyed by the PRA is diminished at each successive stage in the process.

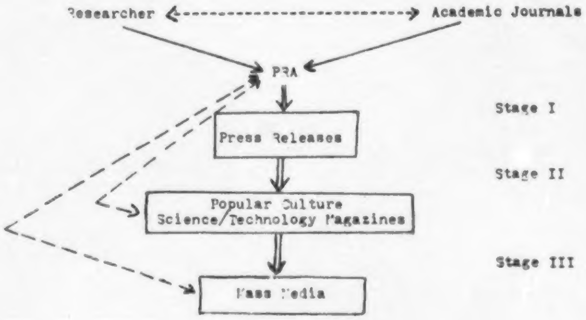

FIGURE.1

At Stage I the audience and the information flow are completely controlled by the PRA. In distributing press releases, the PRA determines what information shall be included and to whom this information shall be sent. The PRA's audience consists mainly of other TCs who would have an interest in the particular breakthrough. Press releases usually contain only the essential facts concerning a particular event. Even if the press releases are reprinted somewhere, they are usually printed exactly as the PRA originally wrote them.

At Stage II the PRA must deal with a broader but still specialized audience. This audience consists mainly of people who maintain an active interest in a certain scientific or technological discipline. It is important to note that while this audience may include some experts and/or professionals, it is composed mainly of persons having a special interest in a particular area. The information diffused is of a fairly technical nature and would appear most often as feature stories in popular culture magazines, scientific or technological magazines or as television documentaries. In addition, at Stage II the information is handled and interpreted by other TCs before being distributed to the intended audience (e.g., the magazine staff writer who is responsible for writing the article and the editor who reviews the article before the magazine goes to press). Since this fairly detailed information is being diffused over a wider audience and being handled by other TCs in addition to the PRA, at Stage II the PRA will attempt to maintain control over the information flow by releasing only carefully selected portions of it.

Finally at Stage III, the PRA provides information for the general audience. This audience is broad, heterogeneous, and its members are more individualistic in their exposure to the mass media. Characteristically, audience members have no sense of relationship to one another through a common interest as does the audience of Stage II. Although the general audience includes both of the audiences of Stages I and II, the information is targeted at the less interested and less educated (general) audience members. At this stage information is simplified and even dramatized in order for it to be understandable. While news stories appearing in Time or Newsweek magazines and blurbs in local newspapers are examples of where the general audience could find this information the general audience tends to obtain most of its information from television. Network news programs, news feature programs (e.g., 60-Minutes or 20/20), talk shows (e.g., Today, Good Morning America or Donahue), and dramatizations (e.g., Quincy, St. Elsewhere or Trapper John, MD) serve as the major mediums through which the information will be disseminated through the general audience. During Stage III the PRA has the least amount of control over the information flow. Since numerous TCs are involved in the presentation of the information, the information is reaching such a large audience, and since the PRA now has the least amount of control over how the information will be presented, the PRA will release the least amount of information at this stage. Obviously the potential for distortion occurring is much greater at Stage III than at the others, so the PRA attempts to limit this possibility by limiting the amount of information being generated.

Stage III will serve as the main focus for this paper and this portion of the theory will be discussed in more detail later in this paper. An application of this theory will also be included as well as a discussion of the limitations and implications of this theory. First, though, it is necessary to review three major assumptions underlying this theory.

ASSUMPTIONS

Communication Assumption

The role of the TC can best be scrutinized by studying the position the TC maintains in the communication process. While the specific role of a TC will vary across different contexts and situations, TCs most often facilitate the transfer of technological information in one form or another. It is important to note two things: (1) the information is transferred but not necessarily generated by the TC, and (2) the information can be communicated in various forms (e.g., documents, visual tapes, audio tapes, etc.). Then for our purposes, communication is characterized as a process or a flow of information in which the TC operates somewhere between the initial source of the information and the final audience for whom the information is intended.

Epitemological Assumption

By defining communication in this manner, it follows that the role of a TC arises from both practical and systems necessities. Any TC must operate within a system of cultural and organizational expectations. Actions are limited by contingency on context and situation as well as policy and procedure. TCs choose from among a culturally and organizationally limited range of alternatives when playing their roles in the communication process.

Furthermore, some measure of practical (personal) choice is involved in any type of communication process. Practical choice entails an individual basing his intentional and purposeful actions on what he thinks a person like him must do to obtain a particular objective, based on his perception of his relationship to various things. Specifically, the actions of a TC will be based upon his relationship to cultural and organizational expectations as well as his relationship to (perception of) his own view of himself in the role of TC. The degree to which a TC's communicative actions will be governed more by either practical or systems necessity is dependent upon the cultural and organizational factors along with the TC's perception of his role in the process.

Metaphysical Assumption

Finally, there are three ways of theorizing about human action. First, communication in the experiencer mode has a focus on the cognitive processes of the individual communicator as they affect and are affected by communication. Secondly, communication in the experiencing mode has a focus on the group as an interactive unit which affects the emergent "group consensus" by affecting the cognitive similarities of the group members. Third, communication in the experienced mode has a focus on the observable behavior whereby descriptions (which also impose meaning) of a phenomena take the point of view of an outside observer. In the present theory the role of TC encompasses all three modes of experience. Practical necessity dictates that the TC makes various decisions regarding how and what should be communicated. Whenever one chooses to act in one way over another based on one's cognitive interpretation of the communication process, one is acting in the experiencer mode. Further, TCs, by definition, enact their roles as part of a process aimed at transferring information. This is accomplished by acting as part of a system or "group" of interacting communicators who agree at least partially on what information is to be transferred and how the information is to be transferred. Finally, the type of communication process in which the TC is involved provides numerous occasions for both internal and external observations of the information transferral system. The very nature of technical communication makes it essential for various audiences (observers) to have experienced it, even if only to ensure accuracy or to be entertained. Specifically, the technical communication process is not complete until the intended audience has experienced the information being communicated.

Having indicated the basis upon which this theory as a whole has been built, Stage III of the theory will now be specified.

THEORY

Three major variables distinguish Stage III from previous stages in the information transferral process: (1) The audience is general and has neither special knowledge of nor interest in a particular breakthrough. (2) Since the audience is a general one the TCs responsible for transferring this information are forced to simplify and even limit the amount of information that is intended for their audience. (3) Because of these factors, the PRA has the least amount of control over how the information provided to the TCs will be presented to the general audience. As a result, the PRA will attempt to release less information and only that information which has the least likelihood of being distorted in the transferral process. The results of these three factors on the information that finally gets to the general audience can be quite significant.

The Audience

The general (or mass) audience can be characterized in many ways. For our purposes, the general audience is: broad, heterogeneous, only partially literate, of low to middle socio-economic status, relatively passive (almost disinterested), gratification oriented rather than idea oriented, and mentally lazy. They turn to their sources for news more for entertainment than enrichment. The information medium most relied upon by the general audience is the television. This audience would rather watch (or "see") for information than to read it. The general audience on the whole can not handle highly technical information so it usually must be altered or filtered in some way to make it intelligible.

Other Technical Communicators

The TCs who obtain information from the PRA and then interpret (or filter) that information then have a difficult task. While they do not aim at intentionally distorting the information obtained, simplifying or limiting the scope of the information obtained almost necessarily leads to problems in accuracy. Again, we are not dealing with intentional distortion, but rather our focus is on the unintentional inaccuracies inherent in technical information that has been altered so that it is comprehendable to the general audience.

The Public Relations Agent

The PRA, whose role in Stage III is to provide accurate information for other TCs to report, releases this information in a different manner than in Stages I or II. Being aware of the characteristics of the general audience, the PRA will release the information concerning only the most simple concepts of a breakthrough. Moreover, the amount of information provided overall will be limited as well. In these ways the PRA attempts to maintain optimal control over the information that will inevitably be altered by the other TCs. Because the scope of information released is limited first by the PRA and then altered further by other TCs to make it comprehendable, the general audience receives information that is neither completely technical nor completely accurate.

The theory in Stage III, as outlined above, can be illustrated by again applying it to a real scientific/technological breakthrough. The breakthrough that Dr. Jerrold Petrofsky, along with others, at Wright State University in Ohio has made in restoring muscle function in paralysis victims and the process by which this information was transmitted to the public will be applied for illustrating our theory.

APPLICATION

The work of Dr. Jerrold Petrofsky and his associates at Wright State University in Ohio was first seen in academic journals of science. The PRA for Wright State, Carol Siyahi, first initialized press releases when Dr. Petrofsky's work was nearing completion. This information dissemination process began with press releases to a select group of publications which ran the press releases virtually without any modification. Scientific and popular culture magazines became interested in running more in-depth coverage of Petrofsky's investigation, and contacted Siyahi for further information. Once Petrofsky was ready to begin testing his apparatus on human subjects, the mass media became interested in covering this aspect of the experiment.

The mass media waited until Petrofsky's theory of and apparatus for the computer stimulation of the leg muscles of spinal cord injured patients could be put to practical use before providing coverage of this scientific breakthrough. There are three main reasons for this delayed coverage. First, the mass media was the last to know of Petrofsky's developments in this area of research because the information was carried first through press releases and then through special interest magazines and journals. Second, the mass media is not solely interested in news, but rather in news events. Research is only news; testing scientific apparatus on people is a news event. Finally, the general audience for mass media is neither interested in nor able to comprehend such an intricate system, as that of Petrofsky's, without being afforded a demonstration. So, as a result, what the mass audience saw on 60 Minutes in November, what they saw on Good Morning America in October, and what they read in Time magazine this fall were the applications of a scientific breakthrough simplified to a very great extent.

DISCUSSION

At this point several questions arise:

1. How much can technical and scientific information be simplified or limited before its accuracy is adversely affected?
2. Are the benefits of knowing at least something about these breakthroughs worth the price of distorted information for the general audience?
3. Whose responsibility is it for maintaining technical accuracy once the information leaves the hands of the PRA?
4. How and where and when do we draw the line between unintentional inaccuracy and intentional distortion, and why is it so very important at Stage III in this theory?
5. How much does the PRA's control over the transfer of information affect the accuracy of the information that is ultimately reported to the general audience?

These questions are not new ones for many technical communicators. Unfortunately, that does not mean that we have answers to all of them. In fact, it is questions such as these that we must deal with over and over again whether they be raised in the context of politics, academia, industry or whatever. In the context of academia, and specifically the scientific and technical branches, the present theory can shed some light on these matters.

First, while in the scientific and technical laboratories accuracy is paramount, the general audience has no need for such a delicacy. The general audience needs only to be made aware of current trends and how they affect society. Simplicity and practicality are not, however, synonymous with distortion. Information must be presented as accurately as possible while keeping in mind the needs of the general audience.

Ignorance is a dangerous thing...especially when it has overcome an entire population. Of course the general audience has a right and a need to know about even the most complicated technological or scientific breakthroughs. Most of the time this can be accomplished with a minimal amount of distortion occurring. But, even if distortion is inevitable, an attempt should still be made to keep the general public informed...as technical communicators it is our task to facilitate this regardless of the price.

It is the responsibility of all those who play a role in the transfer of technical information to maintain the accuracy of that information. This includes, in the case of breakthroughs the PRA and the other TCs involved in the process. Once the information leaves the hands of the PRA it is the responsibility of the TCs to maintain at least the same level of technical accuracy that was displayed by the PRA.

Intentional distortion occurs when PRAs or TCs knowingly alter the technical accuracy of given information so that the meaning and usefulness of that information are diminished. While unintentional inaccuracy can have the same effects, it is due primarily to circumstance and oversight. Neither distortion nor inaccuracy should be tolerated in the transfer of technical information especially when that information is to reach the general audience, since this audience is the most susceptible to regarding such information as truth.

Finally, it is the contention of this paper that if the PRA begins in Stage I to release accurate information, and then continues to release more accurate information in Stages II and III, the information ultimately transferred to the general audience will be much greater than if the information were to start out being oversimplified or limited in scope.

The role of the PRA as technical communicator in the scientific or technological breakthrough is crucial in maintaining the accuracy and intelligibility of information transferred to the public across every stage in this process.

CONCLUSION

As technology and science continue to make advancements that pervade our lives, the role of the technical communicator becomes more important and even more critical than ever before. It is imperative that information reach every type of audience by the most efficient and effective means possible. Recognizing, as this theory does, that this task involves many complicated and conflicting goals, technical communicators can then devise ways of disseminating information as accurately and economically as our technology will allow.

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USING MODULARITY AND TREE STRUCTURING IN THE ORGANIZATION OF DOCUMENTATION

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ABSTRACT

The increased complexity of computer sytems has placed new demands on the way documentation is organized. When large systems must be supported by several volumes of documentation, each manual must be logically organized so that a user will be guided directly to the information he needs. At Gould Inc., S.E.L. Computer Systems Division, we devised a tree structured organization that meets this criterion. With this method all information is first organized into autonomous modules. Each module is then linked into a tree structure based on its relationship to an established chapter topic. A clearly defined format for elements in the tree assures that a user, beginning at the front of a chapter, can follow a logical pathway through the branches of the tree to the information being sought. An extensive system of cross references links all information related in some way other than through the tree structure. This method improves the usability of the manuals and offers significant advantages in the development and maintenance of the documentation.

INTRODUCTION

The advent of micro-technology in the computer industry has made powerful processing capabilities available in small, relatively cheap micro chips. As a result, the range of practical computer operations has been significantly extended. Hundreds of low level applications from fine tuning a radio to timing the ignition system in a car are now controlled by microprocessors. As this trend continues accelerating, computers will have permeated virtually every facet of our daily lives by the end of the decade.

The micro chip has done more, however, than dramatically broaden the range of practical computer applications. It has also drastically increased the complexity of computer systems. Highly complex applications--such as weather modelling, flight simulation, and process control--that as late as ten years ago were considered feasible only in theory, are now being routinely developed and marketed. The effect on documentation has been profound.

The amount of information required by users who must operate and maintain these systems is massive. Technical writers are often faced with the task of organizing documentation that requires several thousand pages to adequately support the product. Under these circumstances it is no longer acceptable to dump all related information into a section and require that the user page through the entire section in search of a specific item. A manual must now be more than a structured collection of data; it must also serve as a directory that provides rapid access into that data.

To satisify this criterion, documentation must be organized so that two fundamental requirements are met.

The first requirement is that all information must be accessible through some logical algorithm. Simply by knowing how a manual is organized, a user should be able to go directly to any item of information no matter how insignificant or limited in application that item might be.

The second requirement is that the organization must provide multiple entry points into the algorithm for accessing information. That is, if a single item of information is related to topics in several different sections of a manual, the user should be able to systematically arrive at that item regardless of which of the relevant sections he is in. For example, consider a communications product containing a special utility that generates statistical reports. Since the utility's function is distinct from the rest of the product, its operational procedures must be documentated in a separate section. However, the utility must be installed at the same time as the rest of the communication system. The documentation must be organized so that the user installing the communications product will know that the utility must also be installed and will be able to find the installation procedure with a minimum of effort. On the other hand, a user who is in the section containing operational procedures may want to know what values are placed in certain files when the utility is installed. Therefore, the installation information must be accessible from both places in the documentation.

At Gould Inc., S.E.L. Computer Systems Division, we devised a method of organizing software documentation that meets both of these requirements. The algorithm that allows the user to logically access information is a tree structure in which information topics and subtopics are arranged according to their subordinate relationships. To provide multiple entry points into this structure, we established an extensive system of cross referencing.

MODULARITY AND TREE STRUCTURING

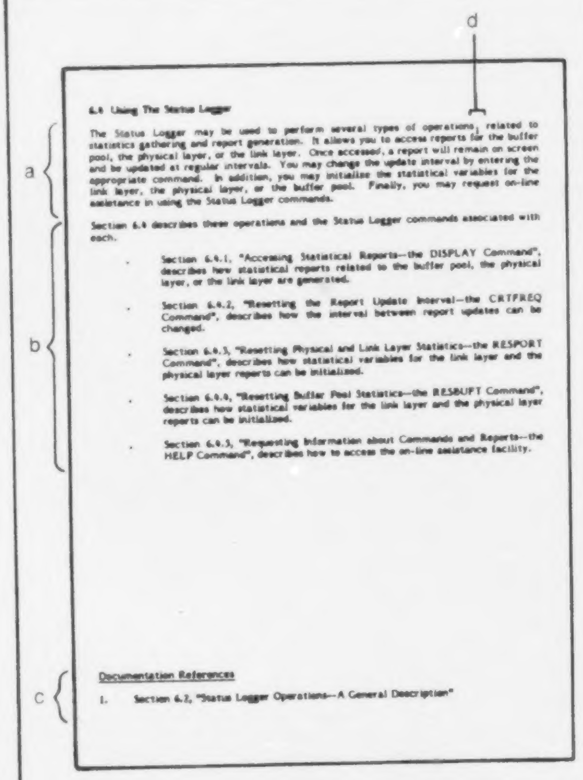
With the tree structured method of organization, once the general scope of each manual is defined, information categories are established based on the function of the manual and on its target audience. These categories will ultimately become the chapters in the manual. Information related to each chapter must then be organized into integral modules. That is, every function, operation or procedure that is required to support the product must be organized so that it can be presented as a single topic with no other topics subordinate to it.

Using the topic modules as fundamental elements, the next step is to create a tree structure within each chapter. Each chapter topic is divided into major subtopics based on the relationship of the modules to the chapter. These subtopics define the first level of branches in the tree. The subtopics are further divided to form the second level of branches, the third level, etc. The process of subdivision is complete when all branches have been reduced to the module topic level.

Thus, the tree consists of two types of elements--nodes and modules. At the root of the tree is the root node representing the main topic of the chapter. Within the branches, node elements represent subdivisions of the main topic. At the terminal end of each branch are modules representing the fundamental items of information required by the user.

With all information logically linked into the tree structure, the final step is to physically represent this structure within the manual. To achieve this, all elements--both nodes and modules--must be presented as physically distinct sections or "blocks". Each block must begin on a new page with the block's section number and title appearing in the upper left hand corner. The format for each block is rigidly defined depending on whether the block is a node or a module.

Nodes A node is any block dealing with a topic that has been further subdivided i.e. that has other blocks subordinate to it in the tree structure. The function of a node is twofold; (1) it serves as a link between the subordinate blocks by summarizing the general topic that each is related to; and (2) it serves as a guidepost in the tree structure by specifically identifying each subordinate subtopic thereby allowing the user to determine in which branch of the tree he wishes to continue searching.



6.4 Using The Status Logger

The Status Logger may be used to perform several types of operations,1 related to statistics gathering and report generation. It allows you to access reports for the buffer pool, the physical layer, or the link layer. Once accessed, a report will remain on screen and be updated at regular intervals. You may change the update interval by entering the appropriate command. In addition, you may initialize the statistical variables for the link layer, the physical layer, or the buffer pool. Finally, you may request on-line assistance in using the Status Logger commands.

Section 6.4 describes these operations and the Status Logger commands associated with each.

- Section 6.4.1, "Accessing Statistical Reports--the DISPLAY Command", describes how statistical reports related to the buffer pool, the physical layer, or the link layer are generated.
- Section 6.4.2, "Resetting the Report Update Interval--the CRTFREQ Command", describes how the interval between report updates can be changed.
- Section 6.4.3, "Resetting Physical and Link Layer Statistics--the RESPORT Command", describes how statistical variables for the link layer and the physical layer reports can be initialized.
- Section 6.4.4, "Resetting Buffer Pool Statistics--the RESBUFT Command", describes how statistical variables for the link layer and the physical layer reports can be initialized.
- Section 6.4.5, "Requesting Information about Commands and Reports--the HELP Command", describes how to access the on-line assistance facility.

Documentation References

1. Section 6.2, "Status Logger Operations--A General Description"

Figure 1 A typical node block showing (a) the summary segment; (b) the linkage segment; (c) the documentation references segment; and (d) a call-out. The call-out is defined in the documentation references segment.

The format for a node requires that the block be organized into two distinct segments--the summary segment and the linkage segment.

The summary segment begins immediately below the block section number and title. The summary consists of a brief general description of the main topic. This segment need not be exhaustive in detail; one or two paragraphs will usually suffice. However, the relationship of each subtopic to the main topic must be clearly indicated in the description.

The linkage segment must follow the summary segment in the physical layout of the block. The linkage section functions as a local directory to the subordinate blocks. It is composed of a series of separate paragraphs or "links". Each link identifies a subordinate topic and associates it with the title and section number of the related block.

A typical node block is illustrated in Figure 1.

Modules A module is a block that describes entirely any function, operation, or procedure. Modules represent the most fundamental level of information in each branch; topics presented in modules are not further subdivided.

Modules must be autonomous; all information related directly to the topic being presented must be contained within the module. At no time should the user be referred elsewhere in the documentation for essential information. References to other sections or to other manuals are permissable only if the information being referenced is not integral to the topic.

Module blocks must begin on a left hand page. The module consists of two distinct segments--an information segment and an illustration segment.

The information segment must begin immediately below the section title and number. In this segment, the module topic is completely developed either through a textual description or through a step by step procedure.

The illustration segment must begin either directly below the information segment or at the top of the page facing it. In the illustration segment the block topic is recapitulated in graphic form or is demonstrated through an example of a typical stream of commands or sequence of events.

When the illustration segment consists of artwork, the block topic must be summarized in simplified form by a drawing or a series of drawings. A brief explanation that clarifies each drawing and highlights key points in the topic must accompany the artwork.

When an example is used, the example must illustrate a typical implementation of the procedure described in the information segment. If there are several common methods of implementation or if special restrictions apply to a specific method of implementation, each of these circumstances must also be illustrated by examples.

All examples must be accompanied by an explanation. The explanation must begin with a description of the initial state of all elements directly involved. It must then illustrate, in step by step fashion, what occurs when the operation being illustrated is executed. Finally, the explanation must show the state of the elements after the operation is completed.

A typical module block is illustrated in Figure 2.

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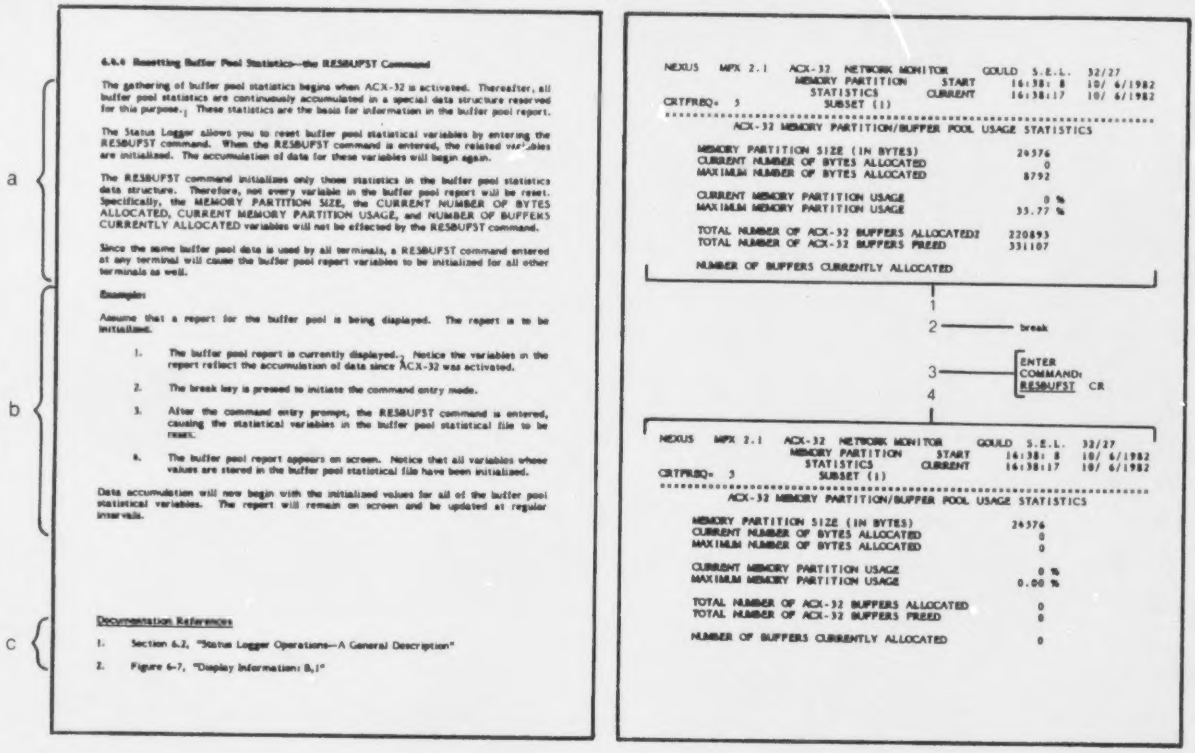
a
b
c
1
2
break
3
4

6.6.6 Resetting Buffer Pool Statistics—the RESBUFST Command

The gathering of buffer pool statistics begins when ACX-32 is activated. Thereafter, all buffer pool statistics are continuously accumulated in a special data structure reserved for this purpose.$_1$ These statistics are the basis for information in the buffer pool report.

The Status Logger allows you to reset buffer pool statistical variables by entering the RESBUFST command. When the RESBUFST command is entered, the related variables are initialized. The accumulation of data for these variables will begin again.

The RESBUFST command initializes only those statistics in the buffer pool statistics data structure. Therefore, not every variable in the buffer pool report will be reset. Specifically, the MEMORY PARTITION SIZE, the CURRENT NUMBER OF BYTES ALLOCATED, CURRENT MEMORY PARTITION USAGE, and NUMBER OF BUFFERS CURRENTLY ALLOCATED variables will not be effected by the RESBUFST command.

Since the same buffer pool data is used by all terminals, a RESBUFST command entered at any terminal will cause the buffer pool report variables to be initialized for all other terminals as well.

Example:

Assume that a report for the buffer pool is being displayed. The report is to be initialized.

1. The buffer pool report is currently displayed.$_2$ Notice the variables in the report reflect the accumulation of data since ACX-32 was activated.
2. The break key is pressed to initiate the command entry mode.
3. After the command entry prompt, the RESBUFST command is entered, causing the statistical variables in the buffer pool statistical file to be reset.
4. The buffer pool report appears on screen. Notice that all variables whose values are stored in the buffer pool statistical file have been initialized.

Data accumulation will now begin with the initialized values for all of the buffer pool statistical variables. The report will remain on screen and be updated at regular intervals.

Documentation References

1. Section 6.2, "Status Logger Operations—A General Description"
2. Figure 6-7, "Display Information: B,1"

```
NEXUS   MPX 2.1   ACX-32  NETWORK MONITOR     GOULD  S.E.L.   32/27
                  MEMORY PARTITION     START     16:38: 8   10/ 6/1982
                    STATISTICS       CURRENT     16:38:17   10/ 6/1982
CRTFREQ=  5           SUBSET (1)
*********************************************************************
        ACX-32 MEMORY PARTITION/BUFFER POOL USAGE STATISTICS

    MEMORY PARTITION SIZE (IN BYTES)               24576
    CURRENT NUMBER OF BYTES ALLOCATED                  0
    MAXIMUM NUMBER OF BYTES ALLOCATED               8792

    CURRENT MEMORY PARTITION USAGE                     0 %
    MAXIMUM MEMORY PARTITION USAGE                 35.77 %

    TOTAL NUMBER OF ACX-32 BUFFERS ALLOCATED2     220893
    TOTAL NUMBER OF ACX-32 BUFFERS FREED          331107

    NUMBER OF BUFFERS CURRENTLY ALLOCATED
```

```
ENTER
COMMAND:
RESBUFST  CR
```

```
NEXUS   MPX 2.1   ACX-32  NETWORK MONITOR     GOULD  S.E.L.   32/27
                  MEMORY PARTITION     START     16:38: 8   10/ 6/1982
                    STATISTICS       CURRENT     16:38:17   10/ 6/1982
CRTFREQ=  5           SUBSET (1)
*********************************************************************
        ACX-32 MEMORY PARTITION/BUFFER POOL USAGE STATISTICS

    MEMORY PARTITION SIZE (IN BYTES)               24576
    CURRENT NUMBER OF BYTES ALLOCATED                  0
    MAXIMUM NUMBER OF BYTES ALLOCATED                  0

    CURRENT MEMORY PARTITION USAGE                     0 %
    MAXIMUM MEMORY PARTITION USAGE                  0.00 %

    TOTAL NUMBER OF ACX-32 BUFFERS ALLOCATED           0
    TOTAL NUMBER OF ACX-32 BUFFERS FREED               0

    NUMBER OF BUFFERS CURRENTLY ALLOCATED              0
```

Figure 2 A typical module block showing (a) the information segment; (b) the illustration segment; and (c) the documentation references segment. In the illustration segment, artwork supporting the example is on the facing page.

CROSS REFERENCING

In complex systems, items of information are frequently related through more then one logical pathway. The method of organization chosen will, of necessity, select one of these pathways to the exclusion of the others. In the example of the communications product cited above, we choose to organize the manual according to the type of operations a user would be likely to perform. Therefore, some of the information concerning the statistics gathering utility is found in an installation section, while other information is in the section describing how to generate reports. However, all of this information could have been arranged as easily in a single section covering all aspects of the utility.

To assure that these alternate logical pathways can be maintained, we imposed an extensive system of cross referencing on the organization.

The primary mechanism in this system is a distinct segment called the documentation reference segment. Documentation reference segments appear at the physical end of all blocks—both nodes and modules.

The cross referencing system requires that all references to ancillary information be noted by a subscript placed at the relevant point within the block. In other words, instead of embedding reference phrases (such as "See Sec. 6.1...") throughout the text, these references are marked by a subscripted number. We refer to these subscripts as "call-outs". In the documentation reference segment, each call-out is then associated with the section number and the title of the block that the call-out refers to. (Since the updating of manuals generally occurs asynchronously, call-outs referring to other manuals will identify only the manual title.)

Thus, all references, regardless of where they occur in the text, are routed through the documentation reference segment. Maintaining this common area for outside references allows users to go directly to the references without having to sift through the text. At the same time, the call-outs still permit specific items in the text to be supported by outside references.

MAKING USERS AWARE OF THE ORGANIZATION

Finding information in a manual using tree structured organization is a straight forward procedure. The user first decides which chapter topic the required information is related to. Once in the chapter, he determines which of the first-level subtopics is most relevant. The linkage segment of the root node for the chapter directs him to the appropriate first level block. If that block is also a node, he again decides which subtopic is relevant and follows the link to the appropriate second level block. By repeating this process, he will ultimately arrive at the module containing the information he needs.

However, as with all types of organization, if the user is to gain the intended benefits of the organizational scheme, it is

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absolutely imperative that he understand this scheme and how to use it. Therefore, at Gould S.E.L. we dedicated the first chapter of the manual to describing how the manual is organized and how information can be systematically retrieved. This chapter begins with a brief overview of the information in each chapter. It then presents a step-by-step procedure for finding any item of information. Accompanying the procedure is a flowchart consisting of decision boxes. Each box asks a question about the information being sought. Depending on the response, the user is directed either to the chapter where the information can be found or to the next box in the flowchart. Each chapter then begins with a flow chart of the tree structure organization of topics in that chapter. Within the flow chart each topic block is identified by the name and section number.

ADVANTAGES

The primary reason for taking the tree structured approach to organization is that it enhances the user's ability to find information. It establishes a logical structure with multiple entry points that enables the user to systematically access any item. The requirement that each module within the tree structure be autonomous insures that the user will be able to find all information required for a specific purpose without having to flip back and forth between several sections.

Furthermore, the tree structure itself creates a framework that enables the user to grasp the logical relationship of a given function or operation to the system in general. For instance, at Gould we applied this method of organization to a program development utility called a linker. One of the module blocks describes how to perform a linking operation using object files. By looking at the flowchart in the front of the chapter, the user can tell at a glance that this operation is related to creating an executable image which is in turn related to building a load module--one of the two primary functions of the linker.

However, in addition to improving the general usability of a manual, this method of organization also offers significant advantages in the areas of documentation development and maintenance.

To begin with, confining topics to autonomous blocks facilitates updating or revising a document. Individual blocks or whole branches can be added or deleted simply by modifying the logically related nodes. Information within a block can be revised with little or no effect on unrelated blocks. (In fact, since all blocks must begin on a separate page, changes can frequently be made without altering page numbering.)

When more than one writer is working on a project, the need for close interaction can be reduced by assigning each writer to a different branch in the tree. Since a branch represents an independent logical pathway, information within a branch can be developed independently. This advantage applies not only to the assignment of writers but to the scheduling of work. If circumstances dictate that schedules be revised in certain areas of the project, work can be rescheduled for the affected branches while unaffected branches continue on the original schedule.

Because the cross referencing system collects all references in a separate section, the problem of maintaining these references is simplified. The writer is relieved of the tedious task of scanning the text for cross references. Since the location of all references is readily accessible, records can be established listing each block, and identifying all of the places where that block is referenced. When a section title or number must be changed, the writer can easily trace and modify the corresponding reference in the documentation references segment.

Finally, from a development standpoint the greatest advantage of this method is that it provides a system of organization that is universally applicable, thereby allowing a consistent format to be established for all documents regardless of the subject matter.

CONCLUSION

The trend towards more complex systems will continue to challenge the ability of documentation departments to organize manuals so that the user can quickly find the information that he needs. To meet this challenge, writers must begin to view documentation development as a process of creating an information retrieval system.

The tree structuring method developed at Gould S.E.L offers this kind of logical approach to the organizational problems involved in documenting large systems. It provides a quick and effective guide to every item of information in a manual regardless of how large the manual may be. It represents the type of directory oriented documentation that must evolve if technical documentation is to keep apace with the micro electronic revolution.

Format Design
Help Your Readers Use Your Manuals

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As a writer, you think you've accomplished your task when your manual goes to the printer. You are confident that the users of your product will become more proficient with your product because of your writing skills. You have used clear, simple language; you have used the active voice.

But, have you considered the format of your manual?

The format is actually what your readers see first (although they are probably not conscious of it). People usually flip through a manual, scanning its content, before deciding whether and how much to read. A good format entices people to read your manual and helps them understand more of what you've written.

The primary rule in designing a format is to establish a sense of order. Consistency fosters order; so does judicious use of white space to "frame" the text and graphics.

You can also follow certain principles to make it easier for your reader to scan the page, and to understand your words. For example, tabs or running heads help the reader key in on important information. Also, people understand the same material better when it is limited to specific line lengths and type sizes.

The best time to design a format is while you are defining your manual. Knowing your audience and your manual's purpose are the first steps toward determining a useful format. In addition, your production department can provide guidance as to feasibility and cost-effectiveness so that you can solve problems before the final production crunch. Finally, you can organize your writing to take advantage of the format's special features.

If you consider format, your company's reputation will be enhanced, and your readers will be more inclined to use your manual.

Contrary to popular opinion, technical writers do not have the undivided attention of their readers. After all, readers are very busy people. Just because they have bought a product and do not know how to use it does not mean they will read the manual. Yes, they'll scan through the manual and try to pick out the minimum information necessary, but will they be enticed to get the most out of the manual and your product? Will they have a professional image of your company and be satisfied that your product is easy to use?

The answer to these questions depends largely on how your manual is designed. Your writing style may be impeccable, but this matters little if your customer doesn't read your manual. A manual's format attracts the reader's attention first — how good the format is helps determine whether his attention will be held. A manual that is formidable in appearance (e.g., page after page of solid text without any interesting breaks, graphics, extra white space, etc.) will be quickly set aside. If the customer has the perseverance to read this manual, he will probably become increasingly disgruntled with your company over how difficult your product is to use. On the other hand, a manual that looks inviting will probably be read with great satisfaction.

In short, format is more than something that looks attractive for the customer's first impression. A good format facilitates reading and increases comprehension. This helps your customer get the most out of the manual and the product.

Unfortunately, there is no magic formula that produces the optimum format for all situations. Format decisions must be based primarily on such considerations as who the audience is, what the purpose of the document is, and how the document will be used. Once these questions are answered, you can follow established principles of design and typography to help reduce the trial and error of developing a good format.

CONSIDERATIONS FOR DESIGNING A FORMAT

Listed below are some of the basic questions you will need to answer before designing a format. Many of these questions should be familiar to you; they generally must also be answered before you can organize and write your manual. Answering these questions helps provide you with a structure for making format decisions, as you will see in the next section.

Audience Definition

Who will read your manual? What are their ages? What are their occupations and exposure to your type of product? Will they be receptive to the subject matter, or will they be apprehensive? What is their level of expertise with the subject?

Document Purpose and Use

Is your manual to be read once as a tutorial, or will it be treated as a reference manual — or some combination? Will your manual be used often, or will it be stored on a shelf most of the time? What is a handy size for your manual?

Budget/Production Resources

Will the manual be typed or typeset? Will it be produced in-house or by an outside vendor? Will it be printed or photocopied? Will you be able to use color? How much time will you have to produce the manual?

Special Features

Do you have special situations that need to be accommodated? For example, do you have many illustrations, tables, examples, procedures, or computer listings?

ELEMENTS OF FORMAT DESIGN

Now that you have an idea of what you want your manual to accomplish, you can consider some of the obvious elements of format design, such as:

- Size and binding
- Chapter openings
- Pagination/running heads
- Headings within chapters
- Main body of text
- Graphics and white space

As you consider these elements and how you will incorporate them into a format, keep in mind the primary rule of format design: Be consistent. Your objective is to create an orderly framework that reflects the purpose of the manual and helps the reader get the most out of the manual. A haphazard approach creates a sense of uneasiness in the reader; the reader needs clues as to how the manual is organized so that he can respond. Much of this is subconscious. If you were to ask a reader why he didn't understand a manual, he would not be likely to say, "There were too many typefaces and sizes so that I didn't know whether I was reading a second-order or third-order section. Also, the line length in the text was too long." Rather, he might respond, "I couldn't find the information I wanted." This can be due to the content organization of a manual; but, it can also be due to the format design.

Size and Binding

The size and binding of a manual should be appropriate to its purpose and how it will be used. For example, if the manual will only be read occasionally as a reference, it should have standard 8½-by-11-in. pages and a stiff binding so that it can be stored easily on a shelf with similar manuals. On the other hand, an instruction manual might be smaller, depending on customer needs, workspace, and to some extent where it will be stored when not in use. For example, car owner's manuals are usually small enough to fit in glove compartments. If you choose a smaller size, your printer can recommend which sizes can be printed most economically. In addition, instruction manuals should always be bound in a way that will allow them to lie flat when open.

Chapter Openings

One of the most obvious ways to add interest to a manual and make it useful as a reference tool is to give special treatment to chapter openings. This can be as simple as using a colored stock, a heavier stock, or a divider with a tab to separate chapters. Or, it can be more sophisticated. For example, since you should start all chapters on right-hand pages, you could place an interesting and appropriate drawing or photograph on the facing left-hand page. Whatever your choice, giving special treatment to chapter openings provides several benefits. First, it provides visual relief to the reader; the extra space and/or graphics give him a breather. He also receives a strong clue that a topic has come to an end. This helps structure his learning while he reads through the manual. Finally, an obvious break between chapters helps the reader locate chapters easily, a benefit for a manual that has many cross-references.

Pagination/Running Heads

Manuals that are short and will be read straight through can be paginated consecutively. However, paginating by chapter (e.g., 1-3 for chapter 1, page 3) is generally more helpful to the reader and also more efficient for production. Chapters can be typeset and laid out separately without having to wait for the entire manual to be done in order to paginate. In addition, future revisions will only affect page numbers in a particular chapter rather than the entire manual. Page numbers are most effective in the upper- or lower-outside corners, where they can be seen as the reader flips through the manual. Running heads or feet are also a useful reference tool. These can be used in a variety of ways. For example, the chapter title can be repeated on every page in small type next to the page number. Or, the book title can appear on the left-hand page, and the chapter title on the right-hand page. Another approach is to print a wide colored or shaded "tab" in the outside margin of every page. Inside this tab, place the chapter number or an abbreviation of the chapter title. This is a particularly useful reference tool for the reader.

Headings within Chapters

Headings provide important organizational clues to readers, so they should be as clear and obvious as possible. Enumerating headings, as is often done, makes it easy for the writer to reference other paragraphs, but really does not help the reader much. (With enumerated headings, a first-order head might be 1, a second-order head 1.1, a third-order head 1.1.1, and so on.) The reader needs more descriptive headings and visual clues as to the relative importance of headings. These clues can include using different type sizes, extra space, and color. Following is a list showing the relative importance of some of the ways to treat headings, from most to least importance.

- Type Style
  - — Large type size, boldness, color
  - — Italics, underlined
  - — Not underlined or enhanced in any way
- Location
  - — Placed above text, centered
  - — Placed above text, flush left
  - — Run in with text

Headings may be set in a different typeface from the main text for emphasis. However, choose a typeface that is compatible with the text and do not vary the typeface within the headings. Instead, vary the size, boldness, location, etc. As an example, a first-order heading might be 4 points larger than the text, in color, centered above the text. A second-order heading might be 2 points larger than the text, in boldface, flush left above the text. And a third-order heading might be the same size as the text, but in boldface italics and run in with the first line of text.

When you place headings above text, be sure to leave enough space above and below the headings to make them obvious. Also, avoid setting headings in all capital letters (all caps), as they are difficult to read. However, you may wish to use all caps for your first-order headings if you are typing instead of typesetting. (But try to keep the headings short.) Your options for emphasizing headings are fewer when typing, but the principles are the same.

Of course, whether you're typing or typesetting, the specific choices you make depend on the purpose of the manual. Headings are extremely important in reference manuals. Consider making larger outside margins in which to place the headings alongside the text; the reader can then locate headings as he flips through the manual. This has another benefit in that it shortens the text line width (as described in the next section). However, this method can also increase production time.

Main Body of Text

How you treat your text is very important to helping your customers read and understand your manual. Researchers have done numerous studies on how people read; the results can help you make your text legible and readable. (Legibility means type can be read efficiently. Readability means text can be easily comprehended.) These are the major factors that must be considered:

- Type size
- Line length
- Leading (line spacing)
- Typeface
- Letterspacing and wordspacing

Type size. Your choice of type size depends upon how your manual will be used and who will be reading it. For text requiring sustained reading, sizes from 9- to 12-point type provide the best legibility, with 10-point type generally preferred. Younger and older people require larger type. For text that will only be read in small amounts, such as footnotes and bibliographies, smaller type is fine, generally 7 to 8 point. Do not use type smaller than 7 point.

Line length. Line length recommendations are based on studies of how people read. Short lines make it difficult for people to read in the word groupings to which they are accustomed; long lines make it difficult for people to find the beginning of the next line when they reach the end of the first line. Generally 50 to 55 letters, or 10 to 12 words per line, are recommended, depending upon the width of the letters of the typeface being used. For 9- to 12-point type, this translates to a line width of about 18 to 24 picas (3 to 4 in.). For 7- to 8-point type, try a width of about 12 picas (2 in.). In addition, decide whether your lines will be ragged right or justified. (Ragged right means text is flush left but not flush right. Justified means text is flush left and right.) Justified text is popular because it gives the manual a crisp, orderly look. However, text with ragged edges is slightly more legible because the wordspacing tends to be more natural.

Leading. Leading (line spacing) is also important for legibility. Again, too much and too little leading hamper the ease of reading. A moderate amount is best, from 1 to 4 points for 9- to 12-point type. For 10-point type, about 2 points of leading are optimal. (If you are typing, single or single-and-a-half spacing are best.)

Typeface. Serif as opposed to sans-serif typefaces are easier to read. (The text of this paper is set in a serif face, Schoolbook. The headings are set in a sans-serif face, Helvetica.) In addition, a medium face is easier to read than a bold- or lightface. Boldface rather than italics should be used for emphasis, because italics tend to slow down reading. Avoid using reverse type for the same reason. Above all, don't use too many typefaces in one manual; try to achieve unity and harmony.

Letterspacing and wordspacing. Another factor in legibility is how much space there is between letters and words. If there is too much space, the eye cannot follow the type or read efficiently in word groups. If there is too little space, the eye cannot distinguish separate letters and words. Spacing problems are most common in justified text, since the text must be filled out to the full line width. If you must fill out a line, add wordspacing, not letterspacing. A normally spaced line should have about 1/3 em between words. If possible, avoid using more than 1/2 em, and less than 1/4 em between words. Another way to improve the legibility of words is to kern, or remove space between certain letters. For instance, if typeset with normal spacing, you might see "You." However, kerning produces a more natural "You."

Graphics/White Space

Use good design judgment in sizing and laying out illustrations. Provide variety, but not lack of organization and balance. Also provide for adequate white space. The reader needs a visual breather, which you can provide in your format — don't crowd your text and graphics so close together that your customers won't or can't read your manual. You may think you're saving money by reducing the total pages in your manual, but you're not producing a satisfied reader.

WRITE TO YOUR FORMAT

Simply having a good format does not solve all of your readership problems. You need to view it as a box of tools, and use these tools in your writing to make the whole manual truly stand out. For example, create natural white space by breaking up your material in as many paragraphs as is appropriate. (Note! This does not mean subordinating countless headings. Simply divide your subject matter into logical units that can be grasped easily.) Also, particularly if you have a reference-manual format that emphasizes headings, write descriptive, useful headings. Finally, support your text with illustrations whenever possible. In short, think and write more graphically. You'll find other ways of writing to your format, depending on what it is designed to do for your manual.

WHEN TO DESIGN YOUR FORMAT

As you may realize by now, format design is very complex, and is very important to your manual. The best time to design a format is before you begin writing, when you are defining the manual. Your definition of the manual affects decisions about format. In addition, starting early gives your production department ample time to help you with the design and advise you as to cost and feasibility. Make use of their skills. Your typesetters are trained in typography/legibility principles and your artists in design principles. They can prepare sample pages and "dummy" layouts so that you can all have an understanding of the final format, and not be surprised later when it's almost too late to do anything. And remember, changes are a serious matter, because any change you make will most likely be interrelated to other elements that may also have to be changed.

IN CONCLUSION . . .

Designing formats is a discipline in itself. In the publishing industry, book designing is a profession. In addition, there are many detailed books published on the subject. Unfortunately, there is little information that relates specifically to technical manuals. This paper presents just enough information to make you familiar with the subject. But you should explore further, and apply the principles that you learn to the requirements of your particular manuals — your readers will appreciate it.

To help you with ideas, obtain copies of other manuals produced in your industry. Then examine them both for new solutions and for mistakes that you should avoid. In addition, learn more about the principles of designing formats. Listed below are a few standard references, each of which has a good bibliography.

Lee, Marshall. *Bookmaking: The illustrated guide to design/production/editing*, 2nd ed. rev. New York: R. R. Bowker Company, 1979.

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Turnbull, Arthur T., and Russell N. Baird. *The Graphics of Communication*, 3rd ed. New York: Holt, Rinehart and Winston, 1975.

WRITING ONLINE HELP

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Human Factors Society

ABSTRACT

Increasingly, technical writers are being called on to write information for online presentation. While the "mainline" interactive system may be written by the system designers and programmers, the task of supplying the online system documentation—or HELP screens—usually falls to the technical writer. Writing for online presentation presents special problems for the technical writer used to dealing with hard-copy publications: problems of screen navigation, screen format, appropriate content, and writing style. The solution to these problems depends on an understanding of the special nature of online information presentation and of the cognitive psychology of online usage. While this paper addresses these problems as they apply to online HELP material, the results are also applicable to online documentation in general.

INTRODUCTION

Consider the following situation: An online user is engaged in some task at his (or her) terminal. At a certain point, he becomes confused about how to proceed: perhaps he's forgotten the syntax of a command, or is uncertain about the meaning of a data-entry field. Historically, his options have been either to get up and consult a manual, or to ask a colleague for help; both of these options interrupt his concentration and his task. Increasingly, there's another option. He simply presses a key on his terminal marked "HELP," and the information he needs appears on the screen. He scans the information quickly and resumes his work. This is online HELP.

HELP information, then, is online information delivered to a user, at the user's request, in the context of the user's online task.

In this paper we shall consider some of the reasons for providing such an online facility; some possible designs for the facility; what types of information are appropriate for HELP; how the information should be formatted on the screen; writing style; some implications of short-term memory; and testing HELP.

I would like to begin by making what some might construe as a radical statement: The best HELP facility is a human being. The ideal model for HELP Is your kindly old office-mate, the guy who's been there before, who knows the ins and outs of the system. When you get into trouble, you turn around and ask "Say, Joe, how do you enter 100-byte records with this editor?" And Joe tells you, and you continue with your work, having paused only momentarily.

Your problem in designing a HELP facility is to construct a program analog to Joe--a problem in artificial intelligence, if you will. The rationale for replacing Joe with a program is obvious: a program works even when Joe is at home or on vacation. A program has infinite patience, and a program can, theoretically, spend as much time with you as you need without neglecting its own project deadlines.

We'll come back to this idea of HELP as an artificial intelligence version of Joe, because it's a useful way of looking at the strengths and weaknesses of HELP facilities in general.

WHY HELP?

Putting HELP on interactive systems is becoming increasingly common; it's unusual to see an online system or product without one. What what are the reasons for putting HELP into a system? One of the main reasons has to do with user productivity.

As we all know, personnel costs in the data-processing business are rising, and it's becoming more important to make the scarce and expensive human resource as productive as possible. Online HELP helps you do this in a couple of ways:

- First, HELP keeps users more productive by preventing the situation where your user has to get up from his terminal, look for a manual (which is perhaps in another room), thumb through the manual (which is perhaps out-of-date) till he finds what he needs, and then return to the job at hand. If the HELP facility is well-done, it'll give him what he needs to know right then and there, without interrupting his train of thought or his task.
- Second, HELP affects the way people feel about the system. In a 1978 study Dzida, Herda, and Itzfelt reported on software features users perceived as contributing to quality.[1] Some of the items correlating highest with perceived quality were that the system:
  - "Explain system requests to user if and when necessary"
  - "Supply help features pertinent to any dialog situation"
  - "Explain each command and subcommand on user request"
  - "Make user manuals superfluous"

The mere existence of HELP on a system reflects positively on it. And a system that people like, they use.

- Another related factor, among all classes of user, is embarrassment at not knowing what to do or at having to ask. In some cases, users can actually experience anxiety about keeping their jobs if they ask too many questions or make too many irremediable mistakes. HELP can help in these cases.

WHERE DOES HELP FIT IN?

It's useful to look quickly at the total information package you give your user, and to put HELP in its place within it.

First of all, one hopes users have some sort of system training, be it a stand-up class, a computer-managed instruction course, or an independent study program of some sort. This training brings all users initially to a predetermined level of proficiency.

Second, there are probably user manuals available for the system. These may have been used in the training, so that the users are familiar with them.

Third, if your system is used within the context of an Information Center, there are Information Center personnel available to answer questions about getting started or to serve as human HELP facilities.

All these (with the possible exception of the computer-managed instruction course) are sources of information outside the domain of the system itself. Within the system, you can think of two main categories of information: HELP and EXPLAIN.[2]

It's useful to think of HELP as tactical information, and EXPLAIN as strategic information. HELP assists you with a fairly small task or subtask, rather than the strategy of achieving a larger task. When your user presses HELP, he's got a very specific problem with a field or screen he doesn't understand or some syntax he doesn't remember. Your task is to get him up and running again as soon as possible.

Returning for a moment to your friendly, more experienced office-mate, Joe: When you get into trouble, or forget something, you call him over, he looks briefly at the mess you've got yourself into, tells you how to fix it, and goes back to his work. He doesn't give you a two-hour lecture on OS; if he feels you need this, he recommends a manual or a course.

But that doesn't mean you shouldn't give your user strategic information, as well. In fact, this is a good idea. Just make sure the two kinds of information are clearly differentiated in your mind.

Appropriate information for EXPLAIN would be an introduction to the system and its functions. An EXPLAIN facility on a system is to be desired, because it provides a second line of defense for the user; if HELP fails him, he can go back and review the strategic information. Existence of an EXPLAIN removes the burden of strategic information from the HELP facility, allowing you to concentrate on making it effective tactically.

FORMS OF HELP

There are many different forms--or designs-- for a HELP facility. However, in this paper we shall be dealing with two main forms of HELP: command-driven HELP and prompt-driven HELP. These are so named after the type of system they support.

In a command-driven system, the user has carte blanche to choose what to do and how to go about it (within the constraints of the system and command language, of course).

In a prompt-driven system, the user is led through a task by means of a series of menu and prompt screens. (A simple example of a prompt-driven system is the automated cash dispensers used by banks.)

Command-Driven HELP

In command-driven systems, HELP is typically invoked by a special command, such as

```
HELP topic,
```

where topic is what the user wants HELP with. The system typically responds with a screenful or two of information on the requested topic. This is a very common form of HELP facility. Within this model, you find considerable variation: the command

```
HELP help
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can bring an explanation of how to invoke HELP, plus a list of topics on which HELP is provided. There may be an index of HELP topics. Some command-driven HELPs let incremental building of commands as users browse the HELP panels.

Prompt-Driven

In the prompt-driven case, HELP is invoked from any one of a series of what I'll call operational screens. These screens, typically a combination of prompts and menus, lead the user through the work of the application. When the user invokes HELP--usually through a designated key--he gets one or more screenfuls of helpful information. Typically, the user invokes the HELP screen(s) by pressing a key marked HELP or an assigned program-function key (most often PF key 1). He returns by pressing ENTER or PF key 3.

One form of prompt-driven HELP is quite simple, because you get a single screen of HELP information.

Another, "simple" form of HELP is a field-level HELP. Here, pressing PF key 1 or a HELP key gets you a screenful of HELP on the field your cursor is positioned on.

A somewhat more complex form of HELP is where the HELP screens are connected to each other. The first screen you get may contain general information on the operational screen; the user is invited, however, to access other screens containing related information. Often the information is arranged in a hierarchy. In some cases, the HELP screens are connected in a network, and the network can be traversed by the user, using "navigational" commands or program function keys.

Design Considerations

You may want to be aware of the following considerations when you design your HELP facility:

- It may seem unnecessary to say this, but in a prompt-driven system you should have a HELP screen for every operational screen. (At the very least, if there is no HELP, tell the user "No HELP available.") By the same token, in a command-search argument system, if you don't have information for the topic he asks for, give the user a list of existing topics. Then he can see if something else will do. For example,[3]

```
HELP free

"FREE" not found. Try "HELP EVERYTHING"
```

The user may find what he wants under the EVERYTHING topic; at least he knows what is and isn't available under HELP. However, do have HELP information for each topic you promise!

- Be consistent between HELP and the operational system insofar as possible. For instance, if program function key 3 means exit in one subsystem, it should mean the same in the other. If it doesn't, make it abundantly clear what the program function key assignments are somewhere on the screen.
- You have to guard against the possibility that the new user will do as you say while in HELP, rather than waiting to get back to the "operational domain." Some systems let you handle this--in fact, let you as the designer even invite it--but many don't. If you can't handle it, you have to anticipate it. If you can, have the user's input go into a clearly unsuitable place. This will make it obvious to him that something is wrong.

CONTENT

What information actually goes into a HELP facility? Keeping in mind what we said earlier about HELP being tactical information, rather than the entire system described from all angles, how can be best anticipate what the user will need to know to get started again?

Obviously, what you put in a HELP facility depends on what the tasks are the user is concerned with. However, there are some general, "universal" tasks that we can talk about.

One of the first things Joe would ask you, probably, is "What were you trying to do?" The more Joe knows about what you're trying to do, the better he can help you, and the more you know about the user's task, state of completion, and intention, the more you'll be able to write effective HELPs. This is obviously much easier to do in a prompt-driven system than a command-driven system. For instance, if you know the user is on the second panel of a three-panel set that copies data sets, you have a pretty good idea of what he's trying to do and even how far along he is.

Command-driven systems, on the other hand, typically offer a huge range of function, and it's very hard for the system to know what the task is to help him with. Usually the tasks here have to be defined at a relatively low level, in terms of the atomic commands: Choosing the right command, entering it correctly, and recovering from an error.

Some things to put in HELP:

- How to use the HELP facility
- Where to go for more information (phone numbers, tutorials, manuals)
- What the screen is and what the user is supposed to do with it. For instance, "This screen enables you to schedule jobs..." "Fill in the fields..."
- What his options are and the consequences of each
- What he can do here
- Data type and range for the fields he has to fill in
- Expanded message explanations
- Examples
- Syntax

FORMAT

Formatting for CRTs is a large subject which I don't intend to go into in any great detail. There are excellent guidelines available.[4]

I'll just cover some of the big topics as they apply to HELP.

- Use a consistent format for HELP. This makes it easier for the user to find the information he needs
- Do use highlighting, but keep its use conservative. If you use color, the same applies.
- Use upper- and lower case. It's easier to read for extended strings of text.
- Use illustrations
- Left-justify your text
- Minimize hyphenation
- As with any screen, HELP screens should be structured, broken up into areas, ideally separated by blank lines. One such area might be where you are now (HELP), another the HELP information itself, another how to get back or navigate through the HELP.

WHO SHOULD WRITE HELP?

A person who probably shouldn't write the HELP facility is the person who actually designed or wrote the program the HELP supports. This is for the same reason that the programmer most often isn't the best person to write user documentation: he's too close to the internals of the program, and often lacks a feeling for what the program will actually be used for or the characteristics of the intended users.

A technical writer is probably the best person to do the job. A good technical writer will have the sensitivity and communication skills to translate programmese into task-oriented language that users can understand. But whoever does the writing, they must have had hands-on experience with the system, doing the tasks the system was designed to do.

WRITING STYLE

The principles of good technical writing don't disappear just because you're writing for online presentation. You should still follow the rules of good writing, such as

- Use the active voice
- Keep your sentences short
- Be concrete

Also, remember again that the user who comes to HELP comes there already in some distress. He is probably anxious, frustrated, perhaps hostile.

- Don't be hostile ("You have failed to...")
- Don't be cute or humorous ("Having a little trouble with the EDIT command, are we"?)
- Speak in user's language (if you don't know it, research it)
- Get your terminology straight about what you want the user to do:

  confusing: TYPE TIME/ENTER

  clearer: Type TIME, then press the ENTER key

PROBLEMS WITH HELP

In this part, I'll talk about some problems inherent in trying to write an artificial-intelligence version of your more experienced office-mate Joe.

You Don't Know How Much Your User Knows

The problem of user level is a difficult one. Is the consumer of your HELP information a novice, or an expert? Is he an intermediate, and if so, an advanced or low intermediate? Obviously the same HELP facility can't serve all these users equally well. Some HELPs attempt to solve this problem by monitoring the user's activity and inferring his level from it: he is presented with HELP information appropriate to his sophistication. Another approach is to associate a level with each user profile; when the user signs on, the system knows what level of HELP to provide. Both of these methods involve a rather complex HELP structure: it must be multi-leveled.

A simpler solution is to ensure that all users are trained to a certain level of proficiency. This relieves the HELP facility of the burden of being a tutorial and greatly simplifies the job of the HELP writer: he can safely make some assumptions about what his users do and don't know and can choose a level at which to write the material--say, low intermediate. The expert may well be bored with this level, but so be it; he should still be able to find what he needs, even if it takes a little longer.

They Can't Remember Why They Came to You

This problem has to do with the limitations of short-term memory, probably the worst bottleneck to efficient human-computer interaction. Short-term memory lasts about 30 seconds, and the anxiety, hostility, etc. that a HELP user is probably experiencing may further reduce that number. So when he gets to your HELP panel, he may not remember exactly what it was he didn't know. There are a couple of things you can do to ameliorate this problem.

- You can overlay the operational panel with the HELP material
- You can split the screen, so user can see both the HELP text and the operational panel (as well as fill in the operational panel as he is viewing the HELP text)
- You can permit him to actually enter data on the HELP screen

TESTING HELP

Test your HELP with as many of its intended audience you can round up. Your office-mate may or may not be typical of your intended audience--the odds are against it. Once you've got hold of a test subject, try to observe what he or she does. If you can capture the machine part of the interaction, so much the better. But another thing to capture what they are thinking and what they are trying to do. This you can capture through asking them to say what they're trying to do and recording it, either through notes or on tape.

You should locate trouble spots both in your HELP text and in the operational part of the system by this technique. Keep at it, testing, changing, testing again until these spots are ironed out.

ACKNOWLEDGMENTS

I would like to acknowledge the encouragement and generosity of Dr. Ian Clark, from whose work many of the ideas in this paper are derived. His monograph[5] on HELP is a very useful source of advice for practitioners. I would also like to thank Rich Seidner of the IBM Santa Teresa Laboratory and Jim Boyle of the GPD Human Factors Center for their helpful comments. Finally, I would like to thank Mary Sullivan and Arnie Norden of IBMs Information Systems Group in Menlo Pa , and Sandra Wilborn, Rob Blair, and Walt Traub, all from the IBM Northwestern Region, San Francisco, for taking time from their busy schedules to demonstrate innumerable HELP facilities to me.

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[2] I have borrowed this term, rather loosely, from John Sack in "Online Aid in a Document Management Environment," Proceedings of Share 52, SHARE Inc., p. 1820 (1979)

[3] This example taken from Sack, op. cit..

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OPERATIONAL GUIDELINES FOR AUTHORS, COMMUNICATORS, AND MANAGEMENT

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This paper presents guidelines for improving coordination among authors, communicators and management through 1) communication of technical information via the written word and visual aids, and 2) solutions to economic problems in technical communication for the benefit of research and development management.

INTRODUCTION

Technical publications are often the only visible end product representing the efforts of many scientists and engineers, supporting research personnel, and the most advanced laboratory facilities. Research and development programs are concentrated toward two principal objectives:

1) The Production of Scientific Thought; and
2) The Expression of Scientific Thought - The primary end product of most research, which may amount to millions of dollars on individual projects, consists of publications in the form of technical reports, proposals, technical manuals, scientific papers, etc. These publications represent the visible result of the combined research activities: their quality depends on the effective communication of their message, as well as on the competence of the research which they embody. A significant role in accomplishing this end, "effective communication," is performed by technical communicators, in particular, technical editors and writers.

ABOUT AUTHORS AND TECHNICAL COMMUNICATORS

The technical communicator is "the bridge between those who create ideas and those who use them." The author, who as a scientist creates or originates ideas, is frequently in need of assistance when he attempts to communicate between himself and an "intended" audience. It is the communicator who is expected to "translate" the author's message into language that 1) preserves the message, and 2) conveys it to the audience in terms appropriate to its capabilities and needs.

The technical communicator uses both 1) a firm grasp of language skills and understanding of rhetorical principles; and 2) broad knowledge of the physical and mathematical sciences to enable him to interact successfully with author-scientists. The result is a flow of documents which vitally influence:

1) a successful competitive position through the generation of technical proposals which are the direct source of new corporate business;
2) favorable client reaction toward work in process through technical reports ;
3) favorable public awareness of both image and accomplishments through clear and effective presentation of scientific concepts and technical competence in papers, seminars and brochures; and
4) the consequent prospects of follow-on business.

Figure 1 shows the regenerative influence of effective technical communication upon new and present business potential.

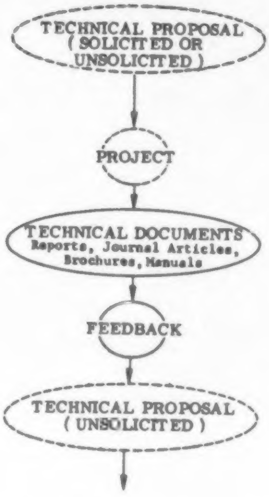

TECHNICAL PROPOSAL (SOLICITED OR UNSOLICITED)
PROJECT
TECHNICAL DOCUMENTS
Reports, Journal Articles, Brochures, Manuals
FEEDBACK
TECHNICAL PROPOSAL (UNSOLICITED)

Figure 1 Regenerative flow in technical communication

"EFFECTIVENESS" IN TECHNICAL COMMUNICATION

"The technical communicator must first distill, and then express the quintessential "truth" buried within a broad matrix of unconvincing fact."

The term "effectiveness" is one of those elusive words in our language whose meaning always seems to escape precise definition. Yet, there is, indeed, a need for clarification and demonstration of what we really mean by "effectiveness." For truly "effective" technical communication depends not simply on skill in logical or coherent sentence formation, even less on grammatical structure, in spite of the many admirable efforts recently advanced toward greater mechanical clarity and simplification.

The Bridge Of Motivation

Through every use of language the human mind necessarily speaks to another human mind. Therefore, twin objectives of the "effective" communicator must be:
1) to know that "other" human mind; and
2) to convince and motivate that other mind toward something.

Merely to inform, no matter how clearly, simply or precisely the information is conveyed, is not enough. What is wanting, conspicuously, in most present-day products in the field of technical communication is this decisive faculty of convincing and motivating. The lack of it is eloquently deplored by Matthew Arnold: "'Tis eloquent, 'tis well, but 'tis not true!"---The Buried Life

The single faculty that most fully determines success in technical communication is the power to express the essence of a truth that lies buried within vast assemblages of scientific facts, acquired through complex experimental or investigative process by specialized minds. A major role of the technical editor is to assist these specialized minds involved in the complexities of acquisition, first to identify, and then to distill in language:
1) the core of truth that best expresses the essential facts or findings of their experiments or investigations; and
2) those emphatic aspects, or highlights, of facts that will convince the "intended" audience.

The Problem Of Computerization

The dominant thrust of contemporary fact-finding is toward the orderly collection, arrangement and consolidation of data, the primary goals being rapid storage and retrievability of maximum volumes of information. However, the greatest danger in the use of data storage systems is that the salience of much information becomes obscured. So many facts are contained in computerized data printouts that it is becoming increasingly common to express the results of experimental programs purely in terms of printout without adequate analysis or interpretation. The useful highlights of much research more and more frequently lie buried within such masses of data, or else within oversimplified data-processed "averages" so that obscurity, rather than enlightenment, is the result.

Interpretation - Who Does It?

It would seem normal for the interpretive and expressive process to be performed by the responsible analyst or scientist. But nowadays he is so overburdened with the excessive demands of empirical data gathering that the interpretive task frequently falls to the technical communicator. His technical awareness and experience enable him to understand the results of research; his communications expertise equips him to extract and reexpress those results precisely to convince the intended audience, for example:

- of the coherence and validity of end results in technical papers;
- of the attainment of research goals (or reasonable explanation for failure to attain goals) for clients, in technical reports; and
- of the qualifications to meet stated objectives of prospective sponsors, in technical proposals.

For each of these goals and audiences, the technical communicator must first distill, and then express, the quintessential "truth" buried within a broad matrix of unconvincing fact. This, then, is the meaning of "effectiveness" as the primary goal of technical communication. How does the technical communicator carry it out?

COMMUNICATING WITH PRECISION

"Make for thyself a definition of the thing which is presented to thee, so as to see distinctly what kind of a thing it is in its substance, in its nudity, in its complete entirety; and tell thyself its proper name, and the names of the things of which it is compounded, and into which it will be resolved."--
Marcus Aurelius: Meditations

Before the communicator can assist authors in constructing meaningful and convincing expression of their ideas, theories or experiments, it is essential, first of all, that authors carefully prepare these ideas and concepts through
1) precision of diction by clearly established and consistent use of terminology, phrases, and sentences which relate to their subject; and
2) planning and organization, before even beginning to write, of all elements which will form a part of the discussion.

Above all, authors should never forget that they alone know their subject and what they wish to say about it. Editors can only offer suggestions to improve the message they think an author intends. Therefore, the author's chief concern should be to determine that message and then to define it distinctly, in terms that express it "in its complete entirety." Its successful transmission to its audience is the direct product of the author's adherence to precision of diction and, equally important, to a complete and coherent organizational plan.

Precision Of Diction - Make Every Word Count

The key to all good writing lies in precision, rather than effusiveness. This in no way implies that every concept can always be expressed within sentences of arbitrarily prescribed limits. Monotonous use of short and choppy sentences does not produce effective writing. The best advice is: "make every word count." Eliminate the extraneous, the ambiguous, the vague terms and phrases that pockmark all mediocre and unconvincing writing and result in jargon, one of the major roadblocks to effective communication. If a term describes exactly what you mean it to say, use it again and again. One of the worst and most habitual defects to which many authors are prone is what might be called "the law of substitution," which means, "never say the same thing twice." The same device, part or process has been called by as many as 20 different and ambiguous names in a single page; or else, and almost as bad, the simple terms have been replaced by equally vague and ambiguous pronouns.

Sentence Structure-Length Versus Readability

Precise diction employs simple, clear words and statements; however, the shortest expressions are not always adequate to contain the ideas to be expressed. Both short and long sentences may be overcomplex, vague or ambiguous. Such sentences in technical literature result from inadequate preparation.

Each sentence should reflect an essential element in the progress of the author's thinking. The author must, of course, know his subject thoroughly in the first place to be able to write about it. But lack of knowledge is not the cause of most poor writing. The cause is nearly always the author's failure:
1) to synthesize every segment of his subject into "core sentences" which keynote or "make a definition" of all pertinent findings; and
2) to develop the "core sentences" into paragraphs that, in turn, progress convincingly toward major conclusions. Such conclusions persuade an audience to accept the author's point of view, to recognize the advantages in his proposed program, or to buy his product. The common alternative is the tedious and nonprogressive boredom to which many authors expose their readers by exuding a veritable taxonomic ooze of unconnected facts, usually following the routine: "then we did this; next we did that."

The following excerpt from "The Physical Geography of the Sea," by the nineteenth century founder of oceanography, Matthew F. Maury, is a good example of precise diction and use of the "core sentence" contained in a convincingly progressive paragraph:

> "There is a river in the ocean. In the severest droughts it never fails, and in the mightiest floods it never overflows. Its banks and its bottom are of cold water, while its current is of warm. The Gulf of Mexico is its fountain, and its mouth is in the Arctic Seas. It is the Gulf Stream."

Regrettably, in the modern world of technology, excellence in writing has diminished in proportion to:
1) the compartmentalization of knowledge and accompanying decrease in emphasis on communicative skills;
2) the current maturing of a generation of scientists and researchers with formative training restricted to visual excitation, especially via telecommunication; and
3) the resulting lack of interest, and sterility, in the art of effective writing.

Nevertheless, even with these limitations, precise diction can be achieved by an inexperienced author who must write reports, if he carefully follows these fundamental rules of effective communication:
1) Identify the type of communication, i.e., report, proposal, research paper, manual, etc. and write consistently with only sufficient detail to meet its requirements;
2) Keep the particular audience, the limits of its understanding, and its information needs constantly in mind;
3) Employ only simple, clear and direct words and sentences;
4) Avoid extraneous and obscure sentence structure.

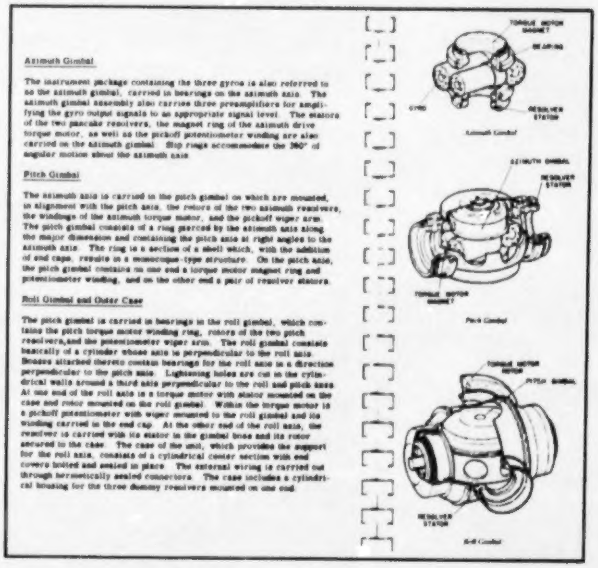
Planning Before Writing

No venture into writing can be begun without first preparing a plan, preferably in outline form, and arranging each element to be discussed in order of "logical development." Such a plan and arrangement are absolutely essential to provide the coherence and development that make an author's final conclusions credible and convincing, especially when his subject involves the results of an extensive investigation or series of tests. Repetitive taxonomic details, one test after another, contribute nothing but boredom to the reader who must wade through the entire assembly before reaching a meaningful discussion and analysis of results. Such supporting detailed information should either be placed in an appendix or synthesized in tabular form. Repeated reference may then be made to the appendix or tables as often as needed without losing the reader's interest in verbal clutter.

Making The "Word" Visible

Visual aids are used in technical publications when information, concepts or ideas cannot be expressed as clearly or succinctly in words. Showing, in addition to telling the reader, is a vital part of the process of effectively communicating.

The integration of illustrations with text so that they enhance, rather than clutter, its message is the editor's responsibility. As a general rule, visual aids, both figures and tables, should be located as closely as possible to their first reference in the text. The immediacy resulting from close contact between written and visual message may well determine its entire effect in producing reader response. Figure 2 is an example of the maximum impact attainable by direct visual contact between a page of text and a flipcard with accompanying cutaway illustrations. The juxtaposition of progressively enveloping images together with their descriptions can prove a highly effective technique as shown in this extract from a successful technical proposal.



Azimuth Gimbal

The instrument package containing the three gyros is also referred to as the azimuth gimbal, carried in bearings on the azimuth axis. The azimuth gimbal assembly also carries three preamplifiers for amplifying the gyro output signals to an appropriate signal level. The stators of the two pancake resolvers, the magnet ring of the azimuth drive torque motor, as well as the pickoff potentiometer winding are also carried on the azimuth gimbal. Slip rings accommodate the 360° of angular motion about the azimuth axis.

Pitch Gimbal

The azimuth axis is carried in the pitch gimbal on which are mounted, in alignment with the pitch axis, the rotors of the two azimuth resolvers, the windings of the azimuth torque motor, and the pickoff wiper arm. The pitch gimbal consists of a ring pierced by the azimuth axis along the major dimension and containing the pitch axis at right angles to the azimuth axis. The ring is a section of a shell which, with the addition of end caps, results in a monocoque-type structure. On the pitch axis, the pitch gimbal contains on one end a torque motor magnet ring and potentiometer winding, and on the other end a pair of resolver stators.

Roll Gimbal and Outer Case

The pitch gimbal is carried in bearings in the roll gimbal, which contains the pitch torque motor winding ring, rotors of the two pitch resolvers,and the potentiometer wiper arm. The roll gimbal consists basically of a cylinder whose axis is perpendicular to the roll axis. Bosses attached thereto contain bearings for the roll axis in a direction perpendicular to the pitch axis. Lightening holes are cut in the cylindrical walls around a third axis perpendicular to the roll and pitch axes. At one end of the roll axis is a torque motor with stator mounted on the case and rotor mounted on the roll gimbal. Within the torque motor is a pickoff potentiometer with wiper mounted to the roll gimbal and its winding carried in the end cap. At the other end of the roll axis, the resolver is carried with its stator in the gimbal boss and its rotor secured to the case. The case of the unit, which provides the support for the roll axis, consists of a cylindrical center section with end covers bolted and sealed in place. The external wiring is carried out through hermetically sealed connectors. The case includes a cylindrical housing for the three dummy resolvers mounted on one end.

Figure 2 Juxtaposition of illustrations and text to achieve maximum reader impact (Source: Northrop Corporation:Electronics Division)

ECONOMICS OF TECHNICAL COMMUNICATION

Most research and development agencies now recognize as a fact of life the necessity of technical communication and the coexistence, if often uneasy collaboration, of communicators and originators. However, relatively few companies consider communication to be more than a burdensome and costly overhead or service function. Even fewer credit technical communicators with professional status

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despite recent favorable legal action by the U.S. Government*.

Nevertheless, it is essential to demonstrate to the agencies that use them that technical communicators not only contribute vitally to the quality of output of even smaller companies; when properly equipped and organized, communicators actually achieve: 1) substantial direct cash savings; 2) release of research and development staff from overinvolvement in publications activities; and 3) consequent new business potential.

The Expense Of Understaffing

The understaffed technical editor frequently operates under severe limitations to maintain minimal work flow of documents which vitally influence:
1) favorable client reaction toward work in process;
2) prospects of follow-on business;
3) competitive position through the generation of technical proposals which are the direct source of new corporate business; and
4) favorable public awareness of the company image and accomplishments.

The result of understaffing can be an undesirable and costly overinvolvement of senior grade scientific staff in nearly every stage of the technical writing and editing process. Such undesirable overinvolvement by scientists has even included proofing for typographical errors of typed manuscript or reproducible copy to permit the understaffed technical editor to keep pace with the volume and rigid deadlines of new reports and proposals.

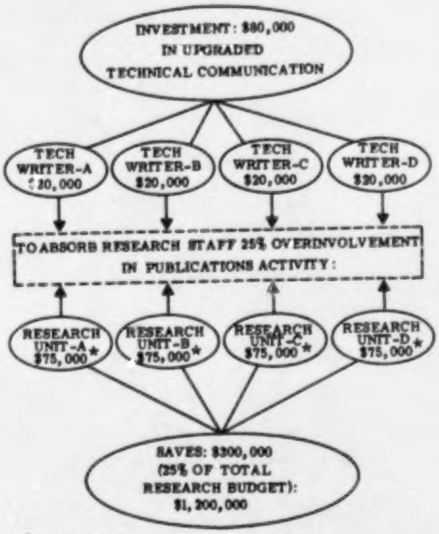
An Economic Solution

A survey of a typical research and development organization (Company X) showed that 40 scientists at senior grade level averaged 50 percent of their time in the actual writing of reports. Company X employed one technical editor. Upgrading technical communication as shown in Figure 3 was designed to reduce scientific overinvolvement in publications activity by at least one half, thereby 1) liberating 25 percent of the the time of senior research scientists, and 2) permitting absorption of 25 percent additional new business without increase in staff. Company X's need for upgrading technical communication was clearly demonstrated.

In addition, substantial cash savings and new business potential were realized by the assignment of technical writers in place of the 25-percent overinvolvement in writing by senior research personnel.

● Cash Savings - None of the new hires indicated in Figure 3 involved increased overhead charges. Time is allowed and reimbursed in most contract work for technical reports preparation.

The absorption by Technical Writers A, B, C and D of the workload previously overinvolving 25 percent of available scientific manpower (see Figure 3) resulted in estimated total cash savings of $300,000 for the 40 scientists of Company X: 40 x $7500 (25 percent of an average salary of $30,000). These total cash savings, $300,000, less the salaries of the four technical writers, $80,000 ($20,000/writer) produced a net reduction in operating costs of $220,000.



*25% of unit complement
(10 research scientists x average salary: $30,000 = $300,000)

Figure 3 An economic solution for a communication problem: research overinvolvement in publications

● New Business Potential - In addition to direct cash savings through the upgraded communication organization (Figure 3), substantial new business potential is now anticipated through: 1) removal from the reports writing process of the previous 25-percent overinvolvement of scientific personnel; and consequently 2) absorption of 25% increase in new business without additional scientific manpower:

	New Business Potential
$2,000,000	Estimated Current Contracts Value
+ 500,000	25% Anticipated New Business Potential* Through Proposed Organization
$2,500,000	

*with no increase in current manpower

Summary Of Economic Benefits

In summary, upgrading technical communication at Company X achieved the following benefits.
1) Efficient handling of the company's primary end-product, technical publications, by specialists in the writing/editorial process;
2) Reports processing manpower sufficient to meet effectively the challenge of increased publications workload;
3) A well equipped technical publications service chargeable to contracts without increase in overhead;
4) Direct savings amounting to 25% of the cost of senior level research staff; and
5) Increased new business potential of 25 percent without increase in technical staff.

CONCLUSION

These are some of the guidelines through which authors, communicators, and management, individually and cooperatively, can improve publications output and quality, while enhancing efficiency and cost-effectiveness.

A complete text on the subject of this paper is in preparation by the author.

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*Smith, F.R., Editorial, Technical Communication, 28 No. 1, p. 3, 1981.

WORKSHOP

NEED TO KNOW: THE WAY TO GO EXPERIENCES IN TASK ANALYSIS

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This workshop lets participants experience that instructions must be tailored not only to the user's reading and education levels but also to the user's task.

Workshop participants will try to complete the same task using different instructions. They will criticize the instructions given them and, based on their experience, suggest instructions better suited to the task as well as to the audience.

Experiences in Task Analysis complements two other conference presentations:

- *The poster session, NEED TO KNOW: THE WAY TO GO, Mixed-Media Advertisement for Panel and Workshop, which opened the conference*
- *The panel presentations, Case Studies in Task Analysis, which focused on usability early in the conference.*

PURPOSES:

- Develop empathy for user through experience with tasks.
- Define and analyze audience explicitly.
- Learn what a "task" is and how a "job" is broken into tasks.

FIRST HOUR

Participation will be limited to 16. Participants will be divided into groups of 4. Each group of 4 will be given an identical set of small, plastic, interlocking bricks and other "specialty" pieces, such as wheels, designed for children at least five years [illegible]. Participants will also be given a small ruler, a log book, and a pen.

All four groups will be told to build the same object, probably a truck. Each group will be given a different set of information (documentation) about the blocks and the job (15 minutes).

- Group A will get a written general technical description of the set of blocks and a written job requirement. Group A will receive no further information.
- Group B will get specific, written, step-by-step instructions for building the object. These instructions will include a parts list to help them select the specific blocks needed from the general set of blocks provided. Group B will receive no further information.
- Group C will get printed nonverbal instructions. These instructions will be line drawings of the steps to build the object. Group C will receive no other information.
- Group D will get one full color picture of the object to be built. Group D will receive no other information.

Each group must do the following:

- Try to complete the job.
- Time their work.
- Keep a log or laboratory notebook of their trials, errors, and successes.
- Record what they needed to know, what they wished they had been told, how they would do it differently next time, and similar insights.
- Present work results and findings to other workshop participants.

SECOND HOUR

The activities of the second hour will grow out of the experiences of the first hour. Workshop participants will apply what they learned from the first hour to a new job presented in the second hour.

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